The profitability and management of the Norwegian Red King Crab (Paralithodes Camtschaticus) fishery

By

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Abstract

The Red King Crab and the consequences of its introduction to the Barents Sea and the North-Norwegian coast has been a source for research in many directions for several years. There has not been much financial research, despite the fact that the Red King Crab is a highly valuable nutritional species which gives it a highly economically value. In this thesis I look into the profitability for the vessels participating in the Norwegian Red King Crab fishery and look upon the challenges which the Norwegian Government faces when managing the Red King Crab. I look into different scenarios for the prevention of the further spread of the Red King Crab to the west is put forward. By using financial analysis and statistical analysis I analyse accounts for vessels fishing Red King Crab and compare them with accounts for vessels with similar sizes and fishing methods fishing in the same area, but not fishing for Red King Crab. My analysing is done for the years 2001 and 2002.

After making the different analysis I conclude that the smaller vessels fishing Red King Crab have considerable higher profitability than the similar sized vessels not fishing Red King Crab. For the larger vessels I can not conclude that the Red King Crab fishing vessels profitability is higher than the vessels not fishing for Red King Crab. Fixed quotas equal for all vessels regardless of vessel size and the trouble with unscheduled secondary catch of Red King Crab in other fisheries might be a reason why larger vessels don't benefit from the Red King Crab fishery as smaller vessels do.

I look into the future management of the Red King Crab west of longitude 26° East, which is the western border where the Norwegian and Russian government has agreed to make effort to prevent the Red King Crab to spread further west. There are introduced different scenarios for how to prevent the Red King Crab to spread further west. I have looked into some consequences for some scenarios introduced by the Norwegian Minister of Fisheries like free access to fish in the area as a contradiction to another scenario which is to make strict regime on who is allowed to fish in the area. A third scenario introduced is to make the area a tourist fishery area, and one scenario introducing bounty on the crab, the last one not introduced by the Minister of Fisheries. In my conclusion I am not stating one as better than the others as I don't believe that one regime can do the job alone. I ask if a combination of the scenarios could be a solution.

Sammendrag på norsk

Konsekvensene av at kongekrabben som en fremmed art er introdusert i Barentshavet har vært gjenstand for forskning og utredninger i flere år. I denne oppgaven skal jeg se på økonomien i kongekrabbefisket sett fra fiskebåtens ståsted. Det har lenge vært en vedtatt sannhet blant fiskere at de som fisker kongekrabbe tjener gode penger på dette. Jeg vil også se nærmere på forvaltningen av krabben, spesielt forvaltningen vest for 26º lengdegrad ved Magerøya.

Jeg analyserer regnskap fra båter som fisker kongekrabbe og sammenligner analysene med tilsvarende analyser av regnskapene til båter med samme størrelse som fisker i samme område med samme redskap, men som ikke fisker kongekrabbe. Jeg bruker regnskapsanalyse og statistiske analyser for å finne om båtene som fisker kongekrabbe har høyere profitabilitet enn de som ikke fisker kongekrabbe. Jeg analyserer og sammenligner regnskap fra årene 2001 og 2002. Jeg finner at de minste båtene som fisker kongekrabbe, de som er under 13 meter lengste lengde, har høyere inntjening og profitabilitet enn båter på samme størrelse som ikke fisker kongekrabbe. Når det gjelder de større båtene, de som er over 13 meter lengste lengde finner jeg at de som fisker kongekrabbe ikke har større inntjening og profitabilitet enn andre båter på samme størrelse som ikke fisker kongekrabbe. En mulig grunn til at de store båtene ikke tjener mer enn de sammenlignende båtene kan være at de har faste kvoter på et visst antall kongekrabber, prosentvis inntekt av kongekrabben på båten vil da bli mindre jo større båten er. Store båter som fisker i der kongekrabben er kan oppleve så store ulemper ved bifangst av kongekrabbe når de fisker på andre arter at de taper økonomisk på dette.

Etter å ha foretatt disse analysene som utgjør hoveddelen av denne hovedoppgaven ser jeg litt på forvaltningen av kongekrabben vest for 26ºØ lengdegrad. Denne lengdegraden ved Magerøya (Nordkapp) er av norske og russiske myndigheter satt som grensa for spredning av kongekrabben vestover. Vest for denne grensa kan norske myndigheter sette inn de tiltak de måtte ønske for å hindre spredningen av kongekrabben. Jeg har sett på noen ulike metoder som man muligens kan tenke seg for å hindre at kongekrabben sprer seg videre vestover, og påpekt noen mulige konsekvenser av disse metodene. Jeg har ikke konkludert med at en metode er bedre enn de andre fordi jeg ikke tror at en metode alene kan løse problemet. Jeg har stilt spørsmål ved om en kombinasjon av flere metoder kan være en ide.

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1.   Introduction

The Red King Crab and the consequences of its introduction to the Barents Sea and the North-Norwegian coast has been a source for research in many directions for several years. The research has mostly been done on the crab's adaptation to the habitats in the North-Norwegian fjords, and how the crab can spread in the future. There is also research on its diet and what impact the invasion of the crab has on its surroundings. There has not been much financial or economical research, despite the fact that the Red King Crab is a highly valuable nutritional and economic species.

In this thesis I will first look into the profitability of the Norwegian Red King Crab fishery. In particular I will investigate if the vessels participating in this fishery earn more than the vessels not fishing the Crab as this has been a long living rumour. I will see if I find differences in key numbers in the accounts for the vessels who fish for Red King Crab as a difference to the vessels at approximately same size from the same area and are using the same fishing methods on other fisheries but who don't fish for Red King Crab.

The vessels fishing for Red King Crabs have got this quota as an addition to other quotas, without loosing other fishing rights. The quota is given as an extra bonus on top of their other income possibilities from fisheries. The reason for giving this few vessels the quota, and not giving quota for i.e. all vessels in Northern Norway, is that these vessels traditionally fish in the area where there is most Red King Crab and that the crab therefore gives them trouble in the other fishery they attend as unscheduled secondary catch, or as predator on fish in the fishing gears used like gillnets and long lines.

To find if there are difference between the vessels fishing for Red King Crab and the vessels not fishing for Red King Crab I need to compare their accounts. A part of this job, like collecting the accounts has already been done by the Directorate of Fisheries for their use in the annual Norwegian study of fishing vessel profitability (Budskjettnemnda for fiskerinæringen 2002/2004). On my request they have been kind enough to provide me with the accounts for the vessels fishing Red King Crab and participating in their annual study, so that I can use them for this analysis purposes. The accounts for the whole group of vessels

fishing in Northern Norway have already been prepared by the Directorate of Fisheries their study, and I can use them for the comparing analysis.

After making this analysis I will look into the future management of the Red King Crab Fishery. Up until now all management of this crab had been after negotiations and in cooperation with the Russian authorities as we are obliged to cooperate with the countries in which we are sharing a resource.

My special emphasis will be on the management of the Red King Crab west of Magerøya[1], where there is an agreement between the Norwegian and the Russian government to prevent the spread of the Red King Crab. The western border for the crab to set is decided to be at longitude 26° East at Magerøy. My point when looking into the management is to look at some consequences of using different regimes to keep the Red King Crab east of Magerøya. These regimes might be to give free access to a Red King Crab fishery west of Magerøya or to give special rights to fish in the area, to introduce the area as tourist fishery area and/or to use subsidies to introduce bounty on Red King Crab in this area.

2. Background

2.1 The writers background for this thesis

My working background is mainly from Norges Råfisklag, which is one of the 6 sales organisations dealing with fish in Norway. In their own presentation they state: *"The Norwegian Raw Fish Organisation (Norges Råfisklag) is the fishermen's own sales organisation for fish, shellfish, molluscs and small whales landed along the Norwegian coast from Nordmøre to Finnmark. The Organisation guarantees growth and prosperity from first-hand fish sales"*. I have been employed there since 1991, about that time Red King Crab was about to be coming known about in Norway. As Red King Crab became a commercial species in Norway it was natural that the turnover between the fishermen and the buyers was

[1] A map of Magerøya and Nordkapp with the western border for the Red King Grab to spread further west in Finnmark county in Northern Norway is in Appendix 1

handled by Norges Råfisklag. After speaking with several fishermen, telling us about this "golden fishery" I became curious. Maybe this was something to research?

My working background is as an accountant, and my education before the master programme (The Cand. Mag. degree) has mostly been concentrating around economics, business administration and statistics. Even though the master programme combines primarily economics and biology, with additional courses in technology, principles of organisation, and law it was clear that I should write something about economy. I therefore concentrate most of my interest in the Red King Crab to the profitability of the Red King Crab Fishery.

2.2   The Red King Crabs reason for being in Northern Norway

Russian scientists, with Jurij Orlov in charge introduced The Red King Crab from the Bering Sea to the Murmansk area during the period 1960-1969. They introduced 2000 females, 1000 males and 10 000 juveniles. The purpose of the introduction was to make a strong stock of this high valuable species so that commercial fishing could commence once the species was well established (Olsen 2003). The project was a success. At this time, the Norwegian government and the scientists knew nothing of this project. If they had, they would probably not have protested. The scientists were not fully aware of the potential damages introduced species could have on the environment (Dørum 2003). The first Red King Crab caught in Norway, which had emigrated from Murmansk, was caught in Varanger in January 1977. (Nilssen 2003).

2.3   The unscheduled secondary catch problem

From the start of the nineties the unscheduled secondary catch of the Red King Crab has become a severe problem for the fishermen in the East-Finnmark area (Seipajærvi 2003). The crabs' become entangled the nets making them almost impossible to release without destroying both the crabs and the nets. The crabs feed on, and crush, the other commercial fish species in the trawls and seines, and eat the bait and the fish caught on long lines. After carrying out research fishing from 1997, the Norwegian Government, in agreement with the Russian Government, opened for commercial fishing for the crab in 2002. The 2002-quota in

the Norwegian Zone was 100,000 animals. The quota in 2003 was 200,000

animals and will be 280,000 animals in 2004 (Fiskeridepartementet 2003). The commercial

catch is for large males. The quota was given to the fishermen whom the Directorate defined

as those who had the most problems with the Red King Crab as unscheduled secondary

catch. The vessels have to be between 8-15 meters long. Otherwise the Directorate of

Fisheries define the fishing vessels in size groups as below 8 meters, from 8-12.9 meters and

13-20.9 meters, 21-27.9 meters and so on. Where the vessels for Red King Crab fishery are

concerned, they make another size group of 8-15 meters. The fishermen having vessels above

15 meters, especially those vessels up to 17 meters claim that their problem with Red King

Crab unscheduled secondary catch is as least as large as the smaller vessels (Norges

Råfisklag 2004).

According to J-217-2002 from the Directorate of Fisheries (Fiskeridirektøren 2002) the quota

is given for the area from Kinnarodden and east to the Russian border in the period from 21st

October to 31st December. There are two groups that may apply to take part in the fishery if

they fulfil all the criteria below:

Group I:

> the vessel must be registered in the fish boat mark register and be between 8
> and 15 meters length,

> the vessel owner and the captain on board has to be noted in section B[2] in the
> fishermen's registry,

> the owner must have been taken part in fishing with the vessel, and caught and
> delivered at least 5 tons of cod taken by gillnets or long-lines in the area from
> Kinnarodden and east to the Russian border in at least two of the years 1999,
> 2000 and 2001 before Sept 1st 2001.

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[2] The fishermen who have fishing as their main full time occupation, and don't earn more than NOK 100.000.- in other occupations is listed in section B, as a opposition to section A which contains all fishermen fishing part time or who don't have fishing as their main occupation. For group II leaf B is not mentioned as criteria, then all fishermen registered in section A or B can participate after application if they fulfil the other criteria.

Group II:

the vessel must be registered in the fish boat mark register and be between 8 and 15 meters length

the vessel owner and the captain on board have to be noted in the fishermen's registry

the owner must have been taken part in fishing with the vessel, and caught and delivered at least 3 tons of cod taken by gillnet or long-lines in the area from Kinnarodden and east to the Russian border in at least two of the years 1999, 2000 and 2001 before Sept 1st 2001

2.4   The management of the Red King Crab on the Norwegian coast

The management of the Red King Crab in the Norwegian coast has up to now been with the emphasis that the Red King Crab is a highly valuable nutritional species with a high economically value. For a long time, since the Red King Crab showed up as a possible resource or problem in our coast, the environmentalists like Bellona or World Wildlife Fund and some of the political parties like SV (the Socialists left party) have stated that they wanted free fishery on the Crab. Their aim is that if there is free fishery, the crab will be fished up, not unlike other fisheries where free fishery has brought fish species into extinction. This aim is based in the Global invasive Species Programme (GISP 1997) where Norway is one of the contributors and the Convention on biological diversity (CBD 1994) where Norway is one of the signing states, says that the countries shall do anything in their power to prevent spreading of alien species.

The Norwegian Government has, as a part of the negotiations with Russia decided that their politics is to recognize that the Red King Crab is a nutrient resource which has a commercial value. Therefore the aim is not to bring the Red King Crab into extinction. On the obligation to the Global invasive Species Programme, the Norwegian Government state that the Red King Crab was introduced before the signing of the convention on biological diversity in 1992 and that it therefore don't have retroactive power.

From 2004 the management of the Red King Crab also has to take into consideration how to prevent the Crab to spread further west and south, introducing the longitude 26° East on Magerøya as the West border for the crab to spread.

2.5   Landed value of Red King Crabs

Table 1:   Landed value of Red King Crab from the start in 1994

Year	Quota # of crabs	# of vessels	Quantity kg	Value in NOK	Value pr Crab	Value pr vessel
1994	11 000	4	32 000	1 115 000	101,-	278 750,-
1995	11 000	5	41 500	1 499 000	136,-	299 800,-
1996	15 000	6	70 500	2 607 000	174,-	446 167,-
1997	15 000	6	69 500	2 565 000	171,-	427 500,-
1998	25 000	16	123 500	4 571 000	183,-	285 688,-
1999	37 500	24	194 500	9 540 000	254,-	397 500,-
2000	37 500	34	211 000	23 073 000	615,-	678 618,-
2001	75 000	123	478 000	40 026 000	534,-	325 415,-
2002	100 000	135	652 000	67 261 000	673,-	498 230,-
2003	200 000	194	1 193 000	90 103 000	451,-	464 448,-
2004	280 000					

As we can see, the quantity and total value of landed Red King Crabs has raised rapidly from the early start of research fishery in 1994 up to this years commercial quota of 280 000 animals to be fished this autumn. Value pr vessel was at its top in year 2000. Value pr crab was at its top in our year 2002, but due to the restricted quota, the value pr vessel was reduced from its top in 2000.

3.   Methods

To analyze the economics and the profitability in the Red King Crab fishery and find if there are differences between the accounts for the vessels fishing for Red King Crab and the comparing group of vessels not fishing for Red King Crab some tools are required, both within the theory of statistics and in the theory of financial analysis.

The last part of the thesis which contains an attempt to predicting the future if some specific management tools are chosen, requires some tools in economics theory. As this is not the main part of the thesis, the theory of economics used is written in the chapter where the theory is needed.

3.1 Brief theory on financial analysis

"2 + 2 = ?

The mathematician: 4

The marketing man: 5 (synergy)

The finance man: 3.8 (depreciation)

The accountant: What would you like it to be?"

(Joke; unknown author)

Financial analysis is systematic adaptations of the accounts with the aim of elucidating underlying economical conditions. (Kinserdal 2000)

The annual Norwegian study of fishing vessel profitability is based on the accounts for the participating vessels over a period of one year. If the vessel changes owner during the year, the account follows the vessel, and not the owner. There will therefore not be any extraordinary costs or incomes in these accounts relating to buying or selling vessels. The accounts show operating numbers on the vessel and not on the vessels owner. Therefore if a ship-owner or a shipping company owns several vessels, there will be separate accounts for each vessel.

As the accounts are based only on the vessels activity, they will not have numbers for taxes, financial dispositions to increase liquidity, or give dividend or other kind of dispositions. As the accounts are anonymised we do not have the companies or the vessels annual reports or any annotations, and we do not have the audit reports. This information is often important to make a proper financial analysis.

However there is data to make analysis on the most important figures to find the vessels profitability. These are (From: Budsjettnemnda for fiskerinæringen (2002/2004)):

Return on total assets gives an expression of the return on the vessels total capital. The total assets are equal to the sum of belongings (Total current assets + Total tangible fixed assets):

☑ Return on total assets =

$$\frac{\text{(Profit on ordinary activities before taxation + Total financial expenses)} *100}{\text{Total assets}}$$

Return on equity gives an expression for the rate of return on the vessels equity. Return on equity gives an expression for the rate of return for those who have put in their venture capital:

☑ Return on equity = $\frac{\text{Profit on ordinary activities before taxation} * 100}{\text{Equity}}$

Operating margin gives how much is earned on every NOK 100 sold:

☑ Operating margin = $\frac{\text{Operating profit} *100}{\text{Operating revenues}}$

By financing it is meant both the sources and the application of the funds. In a healthy financing the capital which is bound in tangible fixed assets should, as a minimum, be covered by long term liabilities and equity. In addition to this, some of the current assets (e.g. fixed inventory reserve) should have its capital backing from long term liability sources or equity.

Equity ratio shows how large a part of the total assets or belongings which are financed by own resources. This ratio also indicates how much capital the vessel can loose before there are losses on external finance. A greater equity ratio indicates greater solidity.

☑ Equity ratio = $\dfrac{\text{Equity} *100}{\text{Total assets}}$

Degree of finance 1 indicates how the tangible fixed assets are financed. This ratio should, according to what's mentioned above about healthy financing, be less than 100. This indicates that long term liabilities and equity fully finance the tangible fixed assets.

☑ Degree of finance 1 = $\dfrac{\text{Tangible fixed assets} * 100}{\text{Long term liabilities + equity}}$

Current ratio 1 indicates the vessels ability to pay its commitments on due date.

☑ Current ratio 1 = $\dfrac{\text{total current assets} * 100}{\text{Total current liabilities}}$

3.2 Brief theory on Statistics

To make comparison between two groups we have to forward a hypothesis on the results and then test if our hypothesis is correct. In our case we use data from the Red King Crab vessels accounts where we have the underlying accounts in question so we can calculate standard deviation and variance on these accounts. But in the comparison data for vessels not fishing for Red King Crab we do not have the underlying accounts, only the weighted average between the two groups fishing with gillnets/hand-line and long-lines.

Theory translated from Løvås (2001): Test of hypothesis when the expectance μ and standard deviation s is unknown (T-test). We have to estimate the standard deviation with the estimation S and use the test statistic

$$T = \frac{\overline{X} - \mu_0}{S/\sqrt{n}}$$

Where $\overline{X}$ is the average between the key numbers in question from the accounts of vessels fishing Red King Crab, μ_0 is the expectance for the Red King Crab fisheries, S is the standard deviation for the Red King Crab vessels and n is the number of Red King Crab fishing vessels attending the study.

T-test: We use the test statistic T from the equation above and reject the null hypothesis if T gets in the critical region given in the table below, where t_a is the quantile in the student t-distribution with n-1 degrees of freedom. In this test I choose a level of a to be 0.05 which gives a 5 % chance of making the wrong conclusion on the difference between the vessel groups. In other words, it's 95% certain that my conclusion is correct. This is a type I error. A type II error occurs when the conclusion does not reject H_0 even though it is wrong.

Table 2:   Alternatives on when to reject H_0 if different alternatives occurs:

H_0	H_1	Reject H_0 if
Alternative 1	$\mu = \mu_0$	$\mu > \mu_0$	$T > t_a$
Alternative 2	$\mu = \mu_0$	$\mu < \mu_0$	$T < -t_a$
Alternative 2	$\mu = \mu_0$	$\mu \, ? \, \mu_0$	$|T| < t_{a/2}$

This presupposes that the population which the accounts are drawn from is normally distributed: In this case the Directorate of Fisheries are using statistical standards to draw the accounts. The accounts are drawn randomly among the vessels that fulfil the criteria that they shall fish on a whole year basis.

In testing the differences I have decided to concentrate on some key numbers and not the whole accounts.

These key numbers are:

- ☑ Operating revenues
- ☑ Total operating expenses
- ☑ Operating profit
- ☑ Total wage paying ability
- ☑ Profit on ordinary activities before taxation
- ☑ Equity
- ☑ Total equity and liabilities

To find if there is significant difference between the Red King Crab vessels and the vessels not fishing for Red King Crab I will let $\overline{X}$ be the average value for the key number in the Red King Crab group I want to test. This test is based on the assumption that the population of vessels the accounts are draw from is normal distributed with expectance µ and standard deviation s, which both is unknown. This gives $\overline{X}$ to be Normal(µ, s /√number of values).

As the quota for fishing for Red King Crab comes as an addition to the other fisheries rights these vessels can have we may assume that the Red King Crab vessels earn more money and have larger profitability than the vessels not fishing for Red King Crab. On the other hand, the Red King Crab quota is given to the groups of vessels who presumably have more disadvantages, having to struggle with the crabs as an unscheduled secondary catch in other fishing activities. I want to find out if the benefit of the Red King Crab quota is a greater benefit than the disadvantages of doing their other fishing in the areas the Red King Crab has invaded. When putting up forward the hypothesis, I assume that the Red King Crab quota is a benefit for the vessels, giving them higher profitability. This corresponds to Alternative 1 in Table 2.

The hypothesis for this testing will be:

H_0:   The average values of the key numbers mentioned above for Red King Crab vessels are lower or equal to the average values of the key numbers for the vessels not fishing Red King Crab. (H_0: $\mu = \mu_0$)

H_1:   The average values of the key numbers mentioned above for Red King Crab vessels are higher than the average values of the key numbers for the vessels not fishing Red King Crab. ($H1$: $\mu > \mu0$)

4.   Data

4.1   Data from the Directorate of Fisheries

To be able to compare two groups I need the accounts from the groups in question for the purpose of analysis. One way of getting the accounts is to go through the fishermen's organisations and get them to contact the fishermen on my behalf and ask them to give me the accounts. Based on previous experience from earlier investigations there are often very low answering percent, maybe especially where there are questions on economy and earnings. Then it's the time aspect. A job like this would require months of work, which the time limit for this thesis don't allow. Luckily the Norwegian Directorate of Fisheries does this job every year. The vessel owners are obliged to send in their accounts. If they don't send in the accounts they face a large fee as a punishment. A student doesn't have, and should of cause not have this power.

The statistics department in the Directorate of Fisheries in Norway, on behalf of the Budget Board for the Fishing Industry makes" The annual Norwegian study of fishing vessel profitability" (Budsjettnemnda for fiskerinæringen (2002/2004)). The investigation is based on accounts for vessels of different sizes, fishing in different locations with different tools at different species. The vessel owners, randomly chose by the Directorate, are obliged to give in their annual accounts.

I sent an application to the Directorate of Fisheries and asked if I could get the accounts for the vessels which has fished Red King Crab in the years 2000 and 2001 and was a part of their study. The Directorate of Fisheries has the total register of the contract notes from the 6 fisheries sales organisations in Norway they knew which vessels that has delivered and sold any kind of species included the Red King Crab.

After having anonymised the accounts so that I should not be able to know which vessels the accounts belonged to the Directorate of Fisheries was kind enough to provide me with extracted data for the vessels which fish for Red King Crab.

I got the data from the years 2000, 2001. For 2000 there were only 4 vessels fishing Red King Crab attending the study, I therefore decided to use the data for 2001 (17 vessels) and sent a new application where I asked for the data from 2002. The annual Norwegian study of fishing vessel profitability for 2002 was not official yet when I needed them in fall 2003 so my comparison is done towards preliminary numbers given to me by mail from the Directorate of Fisheries in February 2004 before the annual study was official 23rd March 2004. The data from 2002 turned out to be from 21 vessels. The preliminary figures I got turned out to be the correct numbers published in 2004.

The two years of accounts I am analysing are somewhat different as 2001 vas the last year with research catch only and 2002 vas the first year with commercial catch. The rules for which vessels was allowed to take part in the commercial catch of Red King Crab in 2002 was set so that the vessel size has to be between 8-15 meters (Fiskeridirektøren 2002). The amount of vessels attending both the Red King Crab fishery and the annual Norwegian study of fishing vessel profitability being 13 meters and above is therefore reduced to 3 in 2002 compared to 7 in 2001. The largest number of accounts is in the group of vessels with size 8-12.9 meters with 10 in 2001 and 18 in 2002[3].

The vessels fishing Red King Crab have to be between 8-15 meters in 2002. In 2001 a few boats fishing Red King Crab was above 15 meters as it still was a research fishery. It would

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[3] In Appendix 2 are the tables of the average accounts from the annual Norwegian study of fishing vessel profitability used in this thesis. In Appendix 3 are tables with average data prepared from the accounts of the Red King Crab vessels.

probably be natural to keep the vessels together as one group size 8-15 meters in my study too. I have to split them in two groups though, one group of small vessels and one group of larger vessels. The reason for this is the way the vessel sizes are divided in the annual Norwegian study of fishing vessel profitability. In this study the vessels sizes are divided in one group of vessels size 8-12.9 meters and another group of vessels from 13-20.9 meters. This gives me a good comparing on the vessels sized 8-12.9 meters, but gives some trouble when comparing the vessels from 13 meters and above as the Red King Crab vessels sizes are averagely smaller than the comparing vessels. Still as the comparing vessels are vessels using gears like gillnets, hand line and long line, most of the vessels in the size group 13-21.9 meters are small vessels. In 2002 the weighted average vessels not fishing for Red King Crab is 15 meters compared to the average length of the vessels fishing for Red King Crab witch is 14.4. In year 2001 as there still was research fishery and not the limitation on 15 meters for Red King Crab vessels the average length of the largest vessels fishing for Red King Crab was 15.8 meters compared to the vessels not fishing for Red King Crab which average length was 15.25 meters.

As the vessels that are obliged to give in their accounts are randomly chosen by the Directorate of fisheries based on normal statistical standards, we can assume that they are a representative selection of the fishing vessel population. Within this randomly draw vessels are also a number of vessels that fish Red King Crab. Being draw randomly we assume that they too are a representative selection of the vessels fishing Red King Crab.

The average accounts from the official study do include the vessels that fish Red King Crab. I have therefore for better comparison extracted the Red King Crab group out of the average tables from the study so that the comparing is made between one group with vessels fishing Red King Crab and one group of vessels that do not fish Red King Crab.

In Table 3 below we see the sample percentage out of total numbers of vessels fishing Red King Crab, and table 4 shows sample percentage out of the total numbers of vessels who don't fish Red King Crab. As we can see the sample percentage on the group not fishing for Red King Crab is slightly larger than for the vessels fishing for Red King Crab. The reason for this is the fact that the Red King Crab fishery is closed and the quota is given to only a few vessels. As the Directorate of Fisheries has chosen the vessels who have to give in accounts randomly, and not after which species they are fishing on, they haven't got in

enough accounts from the Red King Crab fishing vessels to hold up the sample percentage for this group. The sample percentage of the Red King Crab vessels is still high enough to make a good comparison between the groups.

Table 3:   Sample size in percentage of all vessels fishing Red King Crab (RKC).

Year	# Vessels delivering RKC	Sample # of vessels	Sample percentage
2001	123	17	13.82 %
2002	135	21	15.56 %

Table 4:   Sample size in percentage of all vessels not fishing Red King Crab (RKC).

Year	# Vessels	Sample # of vessels	Sample percentage
2001	898	164	18.26 %
2002	941	182	19.34 %

I will compare the data I got from the Directorate of Fisheries on the vessels that fish Red King Crab with the official data in the annual Norwegian study of fishing vessel profitability. The comparison will be between the vessels that fish Red King Crab, with the vessels with similar sizes which fish in approximately the same area and don't fish Red King Crab.

In the comparison I will use the average of the accounts from the Department of Fisheries regarding the Red King Crab vessels up against a weighted average of vessels from Northern Norway fishing with gillnets, hand line and long-line, reduced by the Red King Crab vessels. I found the comparing data in table G 7, G 8, G 11 and G 12 in the annual Norwegian study of fishing vessel profitability. The data is grouped into two groups, one on vessels from 8-12.9 meters and the other on vessels that are 13-20.9 meters. The tables from the study used are presented in Appendix 2.

4.2   A fishing vessel account

In Appendix 2 we can see how the Directorate of Fisheries presents their accounts. For an untrained eye, this might be somewhat confusing. I have therefore simplified the account so that it is easier to follow. I have used their table G8 for 2001 (Appendix 2) as a sample:

Table 5:   Normal simplified account

Operating revenues	2 011 701
- Operating costs	1 832 190
= Operating profit	179 511
+ Total financial revenues	22 309
- Total financial expenses	97 484
= Profit on ordinary activities before taxation	**104 336**

Balance sheet	
Total assets	1 572 044
Equity (Estimated)	227 359
+ Total liabilities	1 344 685
= Total equity and liabilities	**1 572 044**

4.3   The operating expenses in the Red King Crab fishery

To say something about what the benefit, if any, are in having a Red King Crab quota, and decide if to use the quota to fish up the Red King Crabs we need to know something about the expenses in this fishery. There is no use in earning good money by selling the Crab if the expenses incurred in fishing Red King Crab are so large that it eats up the profit.

As the accounts we got from the Directorate of fisheries are anonymised it is difficult to get deeper into the accounts to see how large part of the operating expenses that relates to the Red King Crab fishery. To find these expenses we must find indirect ways of stating these costs.

4.3.1 Comparing the percentage of operating cost related to operating revenue

One way of separating the costs of fishing the Red King Crab from the costs of the vessels ordinary fishery is to compare the operating expenses for the Red King Crab vessels with the group of fishing vessels who not fish for Red King Crab. In the expenses we include the costs that directly relates to the fisheries. If we take the total operating expenses as a start we can leave out the costs relating to the insurance on vessel and depreciation on vessel. These are

fixed costs on the vessel, not depending on the size or distribution of the catch.

The other posts in the total operating expenses we must assume is related to the costs on operating the fishery. We call this post for actual operating post and find the percentage of actual operating post related to the operating revenue and call this the cost percentage.

If the cost percentage of the Red King Crab vessels is less than vessels not fishing for Red King Crab, we can assume that the costs of fishing Red King Crab are less than the cost of doing the other fishery they and the other group of vessels attend. If the Red King Crab fishers cost percentage is larger than the whole group of fishers, we can assume that there are higher costs related to the Red King Crab fisheries than there is in the other fisheries.

Table 6:   Actual operating expenses in % of operating revenue for vessels 8-12.9 meters:

	RKC 2001	RKC 2002	No RKC 2001	No RKC 2002
Operating revenues	**966 448**	**907 847**	**555 294**	**679 875**
Total operating expences	852 265	828 406	516 284	634 303
- Insurance on vessel	-17 231	-21 526	-13 292	-15 861
- Depreciation on vessel	-35 028	-40 715	-23 869	-28 952
Actual operating expences	**800 007**	**766 165**	**479 123**	**589 490**

Actual operating expences in % of operating revenue

RKC 2001	RKC 2002	No RKC 2001	No RKC 2002
82,78 %	**84,39 %**	**86,28 %**	**86,71 %**

Table 7:   Actual operating expenses in % of operating revenue for vessels 13 meters +:

	RKC 2001	RKC 2002	No RKC 2001	No RKC 2002
Operating revenues	**2 996 573**	**2 574 908**	**1 547 351**	**1 787 539**
Total operating expenses	2 524 130	2 310 104	1 459 650	1 602 582
- Insurance on vessel	-67 188	-65 828	-27 082	-36 349
- Depreciation on vessel	-218 967	-368 204	-48 207	-93 477
Actual operating expenses	**2 237 975**	**1 876 071**	**1 384 362**	**1 472 756**

Actual operating expenses in % of operating revenue

RKC 2001	RKC 2002	No RKC 2001	No RKC 2002

74,68 %	72,86 %	89,47 %	82,39 %

As we can see, there seems to be lower operating expenses in percentage of operating revenue incurred by the vessels that fish both in their normal fishing activities and for the Red King Crab fishery, compared to the group of vessels in Northern Norway that don't fish for Red King Crab. This indicates that the costs of operating in the Red King Crab fishery are smaller compared to the income in this fishery than the costs of participating in other fishing activities compared to their income in these other fisheries.

4.3.2 The time as an aspect of setting the expenses of fishing the Red King Crab

Another way of finding the costs related to the fishing of Red King Crab, is to look into how long time they use on the Red King Crab fishery. If they use an average sum of days and we know from the numbers from the Directorate how many days the boats have been drifting, we can say that this percentage of days on Red King Crab fishery also gives the percentage of cost related to the Red King Crab fishery. The weakness of this theory lies in that we don't know if the costs of fishing Red King Crab is equal the costs in other fisheries. We also know that the operating days differ in catch due to season and weather conditions. There are days giving larger catches and probably larger costs, and days of the opposite.

Table 8: Days in Red King Crab Fisheries for vessels 13-15 meters in 2002.

13-15 meters	Value RKC	Total value	# fishermen	RKC % of tot value	Days in RKC Fisheries	Days at sea	% fishingdays on RCK
MEDIAN	210 054	1 651 501	3	7,04 %	7	296	2,36 %
AVERAGE	195 832	2 224 542	3,33	9,85 %	14	282	5,32 %
STD. DEV.	61 268	855 184	1,09	4,34 %	11	23	4,68 %

I have been able to get number of days in fisheries for vessels fishing in 2002. Unfortunately the days at sea data from the annual Norwegian study of fishing vessel profitability only have registrations of days at sea for vessels above 12.9 meters, so there is nothing to compare the fishing time for in the vessels below 12.9 meters. As we can see in Table 8 for the largest boats the RKC income is averagely only 9.85 % with a small standard deviation of 4.34 %. They also use short time in the fishery with an average on 14 days. There are no records to

show if the boat which used longest time on the RKC fishery used some of this time on other fishery. The record shows the difference between the first and the last day of

Table 9:   Days in Red King Crab Fisheries for vessels 8-12.9 meters in 2002. RKC delivery.

8-12.9 meters	Value RKC	Total value	# fishermen	RKC % of tot value	Days in RKC Fisheries
MEDIAN	*246 675*	*839 365*	*1*	*31,10 %*	*22*
AVERAGE	*247 970*	*825 510*	*1,44*	*34,87 %*	*31*
STD. DEV.	*27 159*	*314 083*	*0,51*	*14,51 %*	*22*

As we can see in Table 9 the smaller boats depend more on the Red King Crab fishery. Averagely 34.87 % of the income comes from the Red King Crab. The standard deviation is on 14.51 %. There where examples of vessels who got around 60% of their annual income from the Red King Crab fishery in the background data. On the other hand there where boats earning down to 15% of their annual income from the Red King Crab, but still not as low as for the larger vessels. The time they use on fishing their quota differs a lot. From 3 days up to 60 days, this is shown in the large standard deviation of 22 days. The average here is 31 days. It is important to stress that the time is from first to last delivery of Red King Crab, they may have been fished and delivered other species at the same time of period.

4.4 Experience

When looking into the numbers above trying to say something about the costs in the Red King Crab fishery we might take into consideration the fishermen's own experience in this. The fishermen claim that it is an easy fishery work and that most vessels take their quota in a short period of time. They go out in the morning, setting out the crab cages, returning in the evening to empty them. The costs lies in buying the cages, but which can be used again and again for several years, with small adjustments and repairing done carried out by the fishermen themselves. They of course use bait and fuel and the fishermen needs food, but that's the same for everyone else. They need fewer fishermen onboard than in the other fisheries, the smallest boats having only one man, while in other fishing activities, often being two men in other fisheries is common. (Norges Råfisklag 2004).

5. Analysis

There are four groups of vessels for testing. The last group, vessels in 2002 above 13 meters have only 3 vessels fishing Red King Crab. The vessels fishing Red King Crab are sized between 13-15 meters as vessels above 15 meters are not allowed to take part in this fishery. In the comparison group there are vessels sized between 13-21.9 meters. As mentioned before the average size of the vessels in the two groups are not so different even though the comparing group could be up to 21.9 meters. In both years the average length is close to 15 meters for both groups. These factors might make it difficult to find out if the vessels fishing Red King Crab in this group have benefited of fishing Red King Crab.

5.1 Financial analysis

5.1.1 Return on total assets

Return on total assets gives an expression for the return on the vessels total capital.

☑ Return on total assets =
$$\frac{(\text{Profit on ordinary activities before taxation} + \text{Total financial expenses}) *100}{\text{Total assets}}$$

Table 10:   Return on total assets

Return on total assets	RKC vessels 8-12.9 meters	No RKC Vessels 8-12.9 meters	RKC vessels 13 meters +	No RKC vessels 13 meters +
2001	22.89	8.48	12.30	22.09
2002	11.11	10.48	5.30	17.64

As we can see, the small vessels fishing Red King Crab have a larger return on total assets than the small vessels not fishing for Red King Crab. In 2001 especially, the return on total assets is much larger in the group fishing for Red King Crab. The reason why this has

occurred in 2002 may be the price reduction from 2001 to 2002. For the vessels above 13 meters the picture is the other way around maybe related to the discussion above on few vessels and vessel length.

5.1.2 Return on equity

Return on equity gives an expression of the rate of return on the vessels equity. Return on equity gives an expression of the rate of return for those who have placed their venture capital into the vessel.

☑ Return on equity = $\dfrac{\text{Profit on ordinary activities before taxation} * 100}{\text{Equity}}$

Table 11: Return on equity

Return on equity	RKC vessels 8-12.9 meters	No RKC Vessels 8-12.9 meters	RKC vessels 13 meters +	No RKC vessels 13 meters +
2001	(-)	(-)	22.60	(-)
2002	13.51	22.79	(-)	(-)

Return on equity is one of the most commonly used key figures used to make a good description of accounts. When using it on these accounts I got some strange numbers. The strange numbers was resulted in negative equity. When the equity is negative, there is no point in calculating return on equity. The result gives no meaning as we divide on a negative number. I have therefore put (-) where the results was up to minus several hundred thousand.

For 2002, vessels size 8-12.9 meters, we see that the return on equity was better for those who invested their money in vessels not fishing Red King Crab than if they had invested in a Red King Crab fishing vessel. I would though like to point out though the number "profit on ordinary activities before taxes" is calculated after "labour wages and shares to the crew (included extra shares etc.)" is done. In this vessel size group the fishermen in most cases are the owners themselves. There may be good reasons for the vessel owner to increase "labour

wages and shares to the crew (included extra shares etc.)" and in that way reduce profit (and therefore taxes) for the vessel.

5.1.3 Operating margin

Operating margin gives how much is earned on every NOK 100 sold:

☑ Operating margin = $\dfrac{\text{Operating profit} *100}{\text{Operating revenues}}$

Table 12:   Operating margin

Operating margin	RKC vessels 8-12.9 meters	No RKC Vessels 8-12.9 meters	RKC vessels 13 meters +	No RKC vessels 13 meters +
2001	11.81	7.03	15.77	9.29
2002	8.75	6.36	10.28	10.35

As we can see the operating profit is larger for the Red King Crab vessels in all groups but the last one. This shows that so far there are benefits in the fishing for Red King Crab. The fishery seems to bring up the operating margin. Here again we see that there where better times when there still was fishing for research purposes were still being carried out, and that the commercial fishery might have brought the benefit of fishing Red King Crab down slightly. However there still looks as there is a benefit though unless you are competing with the larger boats.

5.1.4 Equity ratio

Equity ratio shows how large a part of the total assets or belongings which are financed by the vessels own means. This ratio also indicates how much capital the vessel can loose before there is a loss on external finance. Higher equity ratio gives better solidity.

☑ Equity ratio = $\dfrac{\text{Equity} *100}{\text{Total assets}}$

Table 13:   Equity ratio

Equity Ratio	RKC vessels 8-12.9 meters	No RKC Vessels 8-12.9 meters	RKC vessels 13 meters +	No RKC vessels 13 meters +
2001	(-)	0.00	28.93	(-)
2002	58.70	23.39	13.08	(-)

Here we also have some negative numbers due to negative equity. But in this case we can compare, vessels size 8-12,9 meters in 2002 and see that the Equity ratio for the Red King Crab vessels are far above the equity ratio for the other vessels. We also see that the equity rate has risen tremendously for this group from 2001 to 2002. For the group above 13 meters we see that the Red King Crab vessels have a positive equity ratio as oppose to the other vessels which have negative equity ratio.

5.1.5 Degree of finance 1

Degree of finance 1 says something about how the tangible fixed assets are financed. This ratio should according to healthy financing be less than 100. This indicates that long term liabilities and equity fully finance the tangible fixed assets.

$$\text{Degree of finance 1} = \frac{\text{Tangible fixed assets} * 100}{\text{Long term liabilities} + \text{equity}}$$

Table 14:   Degree of finance 1

Degree of finance 1	RKC vessels 8-12.9 meters	No RKC Vessels 8-12.9 meters	RKC vessels 13 meters +	No RKC vessels 13 meters +
2001	92.33	105.98	94.09	76.39
2002	73.01	76.59	107.42	97.34

This ratio should be less than 100. As we can see they are less than 100 for Red King Crab vessels in 2001 and the smallest vessels in 2002. For the smallest boats, the Degree of finance 1 is lower for the Red King Crab vessels than there is for the other group. For the larger boats it seems that the vessels not fishing for Red King Crab does it better, still referring to the reasons for that mentioned at the start of this chapter.

5.1.6 Current ratio 1

Current ratio 1 says something about the vessels ability to pay its commitments on due date.

☑ Current ratio 1 = $\dfrac{\text{total current assets} * 100}{\text{Total current liabilities}}$

Table 15:   Current ratio 1

Current ratio 1	RKC vessels 8-12.9 meters	No RKC Vessels 8-12.9 meters	RKC vessels 13 meters +	No RKC vessels 13 meters +
2001	133.57	96.59	135.36	160.49
2002	404.73	236.58	41.16	106.24

As we can see here the smallest boats fishing for Red King Crab scores higher than the ones not fishing for Red King Crab both in both 2001 and 2002. And again the other way around for the larger vessels, the first year not so much as in the last year.

5.2   Statistical analysis

5.2.1 Testing operating revenues

Operating revenues for the vessel size 8-12.9 meters in 1991:

T = (average RKC vessels – average not RKC vessels)/

(standard deviation/vnumber of RKC vessels)

T = (966 448 – 555 294)/(435 593/v10) = 2.893

I use a t-distributions quantile table to find t_a. A 9 degrees of freedom (10 observations – 1) at a = 0.05 gives t_a = 1.833

According to my hypothesis and table 2 above we can reject H_0 if $T > t_a$

T = 2.985

t_a = 1.833

As 2.985 > 1.933, I therefore conclude that there is a significant difference, and that the operating revenues for the Red King Crab vessels are larger than the vessels not fishing for Red King Crab.

In addition to choosing a level of significance, like I did on 0.05 we can calculate the p-value. The question is then, if we are to reject the H_0 hypothesis based on the data we observe, how great a possibility for type 1 error can we accept? Type 1 error is the error made when the conclusion based on our data is wrong, i.e. if the p-value is 0.01 there in 1% chance that the conclusion you make is wrong. Example; if the p-value for the prisoners in Norwegian jails is 0.05 then 5 out of 100 prisoners is innocently convicted. I use Excel to calculate the p-values and use them in the figures below. The p-value shows the level of power in my conclusion of whether to either accept or reject H_0 or not.

Using the same procedure as above for vessel sized 13 meters+ and for 2002 gives these results:

Table 16:   Testing significant difference in operating revenues.

	Average RKC vessels	Average not RKC vessels	Standard deviation RKC vessels	T	Degrees of freedom	t_a	p-value	Reject H_0?
Vessels 8-12.9 meters 2001	966 448	555 294	435 593	2.985	9	1.833	0.008	Yes
Vessels 13 meters+ 2001	2 996 573	1 865 662	2 098 055	1.426	6	1.943	0.102	No
Vessels 8-12.9 meters 2002	907 847	652 699	314 403	3.443	17	1.740	0.002	Yes
Vessels 13 meters+ 2002	2 574 908	1 787 539	1 757 669	0.775	2	2.920	0.260	No

As we can see, supported by the p-value, we for the small vessels below 13 meters we can reject the H_0 hypothesis of equality between the vessels fishing for Red King Crab and the vessels not fishing for Red King Crab. We can see that in this group there is close to no probability of making a type 1 error.

In the groups of vessels above 13 meters there is not support for rejecting H_0. In these groups we don't find that the Red King Crab vessels have better operating revenues than the other vessels.

5.2.2 Testing total operating expenses

Using the same procedure as in testing the operating revenues gives this table:

Table 17: Testing significant difference in total operating expenses.

	Average RKC vessels	Average not RKC vessels	Standard deviation RKC vessels	T	Degrees of freedom	t_a	p-value	Reject H_0?
Vessels 8-12.9 meters 2001	852 265	516 284	365 439	2.907	9	1.833	0.009	Yes
Vessels 13 meters+ 2001	2 524 130	1 692 306	1 556 498	1.414	6	1.943	0.104	No
Vessels 8-12.9 meters 2002	828 406	611 165	291 498	3.162	17	1.740	0.003	Yes
Vessels 13 meters+ 2002	2 310 104	1 602 582	1 447 605	0.847	2	2.920	0.243	No

Here we for the small vessels below 13 meters, we can also see that we can reject the H_0 hypothesis of equality between the vessels fishing for Red King Crab and the vessels not fishing for Red King Crab. We can see that the expenses follow the revenues. The boats having the highest revenues also have the highest expenses. We will see later if the profit follows the pattern shown, or if the expenses are so high that they negate the revenues.

In the groups of vessels above 13 meters there is not support for rejecting H_0. In these groups we don't find that the Red King Crab vessels have larger operating expenses than the other vessels.

5.2.3 Testing operating profit

Table 18:   Testing significant difference in operating profit.

	Average RKC vessels	Average not RKC vessels	Standard deviation RKC vessels	T	Degrees of freedom	t_a	p-value	Reject H_0?
Vessels 8-12.9 meters 2001	114 183	39 010	90 254	2.634	9	1.833	0.014	Yes
Vessels 13 meters+ 2001	472 443	173 356	560 878	1.411	6	1.943	0.104	No
Vessels 8-12.9 meters 2002	79 441	41 534	79 452	2.024	17	1.740	0.029	Yes
Vessels 13 meters+ 2002	264 804	184 956	432 257	0.320	2	2.920	0.390	No

Also here we for the small vessels below 13 meters see that we can reject the H_0 hypothesis of equality between the vessels fishing Red King Crab and the vessels not fishing Red King Crab. We can see that the operating profit follows the pattern shown despite if the higher expenses for the Red King Crab vessels.

In the groups of vessels above 13 meters there is not support for rejecting H_0. In these groups we don't find that the Red King Crab vessels have larger operating profit than the other vessels.

5.2.4 Testing total wage paying ability

Wage paying ability is not a commonly used key number for analysing the accounts is in question. That is because the wage paying ability is not a line in the official accounts. When we look into the vessels accounts we have to take into consideration the way wages are set in the fishing vessels. The fishing crew does not have fixed salaries; their income depends on the fishery fishing as they are paid a certain percent of the vessels income. For the smaller vessels there is often one or two fishermen employed one of them or sometimes both are the

vessels owner. It is therefore good sense to take the "labour wages and shares"
entry from the expenses side and add it to the operating profit and call it the total wage
paying ability.

While the Directorate of fisheries, on behalf on The Budget Board makes the annual
Norwegian study of fishing vessel profitability, they calculate the wage paying ability and
use it as a key number. The total wage paying ability is an operating profit number,
connected to a period (year) and refers to the vessels economical result for this period. They
take into the calculation the sale of fish in the period, financial income/agio and other
incomes from other activities. In the cost side they take into the calculation the posts R2-R10
(see appendix 2), financial costs, calculated depreciation and rent on equity (3.1% in 2001).

This wage paying ability gives an expression of how much the company could pay to labour
if fixed and variable costs, and cost on capital should be paid first. (Budsjettnemnda for
Fiskerinæringen 2002/2004).

Table 19:   Testing significant difference in wage paying ability.

	Average RKC vessels	Average not RKC vessels	Standard deviation RKC vessels	T	Degrees of freedom	t_a	p-value	Reject H_0?
Vessels 8-12.9 meters 2001	575 307	320 634	292 013	2.758	9	1.833	0.011	Yes
Vessels 13 meters+ 2001	1 761 736	1 137 618	1 277 618	1.292	6	1.943	0.122	No
Vessels 8-12.9 meters 2002	545 047	382 236	181 276	3.810	17	1.740	0.001	Yes
Vessels 13 meters+ 2002	1. 274. 247	1 009 969	999 342	0.458	2	2.920	0.346	No

Here also we for the small vessels below 13 meters, we see that we can reject the H_0
hypothesis of equality between the vessels fishing for Red King Crab and the vessels not
fishing for Red King Crab. We can see that the wage paying ability is better for the vessels
fishing for Red King Crab.

In the groups of vessels above 13 meters there is not support for rejecting H_0. In these groups we don't find that the Red King Crab vessels have better wage paying ability than the other vessels.

5.2.5 Testing profit on ordinary activities before taxation

Table 20:   Testing significant difference in profit on ordinary activities before taxation.

	Average RKC vessels	Average not RKC vessels	Standard deviation RKC vessels	T	Degrees of freedom	t_a	p-value	Reject H_0?
Vessels 8-12.9 meters 2001	83 594	24 125	61 595	3.053	9	1.833	0.007	Yes
Vessels 13 meters+ 2001	261 938	143 120	281 263	1.118	6	1.943	0.153	No
Vessels 8-12.9 meters 2002	65 583	23 889	88 224	2.005	17	1.740	0.031	Yes
Vessels 13 meters+ 2002	-84 366	108 653	456 103	-0.733	2	2.920	0.730	No

Also here we for the small vessels below 13 meters see that we can reject the H_0 hypothesis of equality between the vessels fishing Red King Crab and the vessels not fishing Red King Crab. Here also for the small vessels below 13 meters, we see that we can reject the H_0 hypothesis of equality between the vessels fishing for Red King Crab and the vessels not fishing for Red King Crab. We can see that the profit on ordinary activities before taxation is higher for the vessels fishing for Red King Crab. The negative profit for RKC vessels size 13 m+ in 2002 gives a negative T value.

In the groups of vessels above 13 meters there is not support for rejecting H_0. In these groups we don't find that the Red King Crab vessels have higher profit on for ordinary activities before taxation than the other vessels.

5.2.6 Testing equity

Table 21:   Testing significant difference in equity.

	Average	Average	Standard		Degrees		p-	Reject

	RKC vessels	not RKC vessels	deviation RKC vessels	T	of freedom	t_a	value	H_0?
Vessels 8-12.9 meters 2001	-5 988	-18	562 799	-0.034	9	1.833	0.513	No
Vessels 13 meters+ 2001	1 159 163	-33 077	2 534 065	1.245	6	1.943	0.130	No
Vessels 8-12.9 meters 2002	485 330	104 841	508 885	3.172	17	1.740	0.003	Yes
Vessels 13 meters+ 2002	668 446	- 287 936	1 430 954	1.158	2	2.920	0.183	No

As we could see under point 5.1 about financial analysis, we got some strange equity results where equity was involved. That was because we had negative equity in some cases. This is also the issue here and we can see that we for the small vessels below 13 meters for the year 2001 we cannot reject the H_0 hypothesis. We can though do this in the same size group for 2002. This is the only group out of the four groups where both the Red King Crab vessels and the vessels not fishing for Red King Crab have positive equity.

In the groups of vessels above 13 meters there is not support for rejecting H_0. Even though we can see that the difference in equity in these groups is huge, the fact that there are negative equities involved gives results that support the trend given by the previous tests.

5.2.7 Testing total equity and liabilities

Table 22:   Testing significant difference in total equity and liabilities.

	Average RKC vessels	Average not RKC vessels	Standard deviation RKC vessels	T	Degrees of freedom	t_a	p-value	Reject H_0?
Vessels 8-12.9 meters 2001	524 690	528 752	475 961	-0.027	9	1.833	0.510	No
Vessels 13 meters+ 2001	4 006 686	890 851	6 854 036	1.203	6	1.943	0.137	No
Vessels 8-12.9 meters 2002	826 866	448 260	722 081	2.634	17	1.740	0.009	Yes
Vessels 13 meters+ 2002	5 110 641	1 208 216	3 273 830	2.065	2	2.920	0.087	No

As we can see for the small vessels below 13 meters for the year 2001 we can not reject the H_0 hypothesis. In this group the total equity and liabilities are practically equal. In the small boats below 13 meters in 2002 we can reject H_0.

In the groups of vessels above 13 meters there is not support for rejecting H_0. In these groups we don't find that the Red King Crab vessels have significantly higher total equity and liabilities than the other vessels.

6.   Scenarios for obstructing the spreading of Red King Crab

6.1   The Western border

On November 14th 2003 the Ministry of Fisheries in Norway announced that they had come to an agreement with the Russian authorities that they should put to limitations on the Red King Crabs distribution to the west. The western border for the Norwegian-Russian joint administration of the Red King Crab is by at longitude 26° East, which is close to Nordkapp and Magerøy. (Fiskeridepartementet 2003-1).

In a press release of December 5th 2003 the Department of Fisheries states that it is forbidden to return Red King Crab in the area from Fruholmen Fyr to the Swedish border. The ban is held in the Norwegian EEZ on a line from Fruholmen Fyr to the outer border of the Norwegian EEZ. The press release further states that "At this time it is not cleared which rules will take part for the management of the Red King Crab west for the western border. This will be stated in the rules and regulations for the catch in 2004". Based on previous years these regulations will be ready around fall 2004. (Fiskeridepartementet 2003-2).

6.1.1 Free access to fish Red King Crab west of the border

In April 5th 2004 there was a meeting in Alta where the management of the Red King Crab west of longitude 26° east was discussed. The Norwegian Minister of Fisheries held a speech at the opening, followed by a PowerPoint presentation. His speech mentions two regimes of possible management tools without going much into detail about the consequences of the regimes. He says that there will be a consequence evaluation of the effect of the different regimes. In the speech he says that the western border gives both opportunities and challenges as we east of the western border should treat the Red King Crab as a resource and

west of the border as a threat. He says that this does not mean that the crab west of the border cannot be a resource, but that we cannot let commercial interests come before what was the purpose of the west border. (Ludvigsen 2004)

The Norwegian Minister of Fisheries suggests one of the regimes as the one of free access to the fishery. Where there are no restrictions, anyone can fish the crab, both males and females, the whole year through and sell wherever there is a buyer. If so, they could introduce a report system like the one the hunters have for which animals they hunt in the hunting season.

It is important to prevent the spreading West for Magerøya, and as an aim to accomplish this, free access to fish Red King Crab in this area is a possibility.

A free access to fish Red King Crab involves free access to deliver and get paid for the Crabs. A free fishery on high value species will give incentives to fish and deliver as much as possible. The problem with the Crab as oppose to other species in most fishes is that there is only a few crabs which is commercially valuable. The Crabs that are valuable are the large crabs; mostly males have that size, with a high fullness of flesh in the claws. The crab's claws are mostly filled in the fall/winter from October to January. This gives us a short and intensive fish season. The fact that there are only large males that pays gives the small and the female crabs a good opportunity to spread. The time February to September is also a good time for the large crabs to spread. Fishermen fish to live, to earn money is essential. There is no fisherman that fish for the sake of the environment. They will do what they can to get the large males, and to not get the small crabs. Even the part time fishers and families fishing for their own freezer want to fish what's eatable.

There is a ban on ejecting the undersized and not payable crabs in this area (Fiskeridepartementet 2003-2), but with the case on the news recently regarding ejection of undersized cod in mind, there is reason to believe that the same can happen here. Unlike the undersized cod, the undersized Red King Crab will survive the ejection and will continue to spread.

Let us suppose that the invasive mass of Red King Crab west of Magerøya is massive. There are a lot of large males to make a considerable fishery. The fact that this fishery will be without regulations, will give more vessels, trying to take their part of the resource rent in the

fishery. It will be considerable more crabs to the buyers. When there are more crabs in the market, the demand for crabs reduces, and the prices are falling. Not only the prises for crabs taken in the free access area, but all the crabs as the buyers probably don't differ the crabs fished West of Magerøya from the ones fished East of Magerøya. A good quality crab is worth the same, regardless of where it is caught. If the support of Crabs is without limit, the prices will fall until the resource rent is vanished, and some fishermen are pushed out from the fishery due to low income. The Klondike days will be over, and only the ones who have to do the fishery to survive do take part. This is illustrated in the figure below.

To have two kinds of fishery on the same species, due to geography gives challenge to the controllers. If there is free access west of Magerøya and strong limitations east of Magerøya there have to be monitoring and control regimes to make sure that the fishermen who are not allowed to fish east of Magerøya keeps themselves west of Magerøya. In the border area there will be incentives for the fishermen to cheat if there are more amount of crabs at the east side of the border.

Figure 1: Consequences of open access fishery
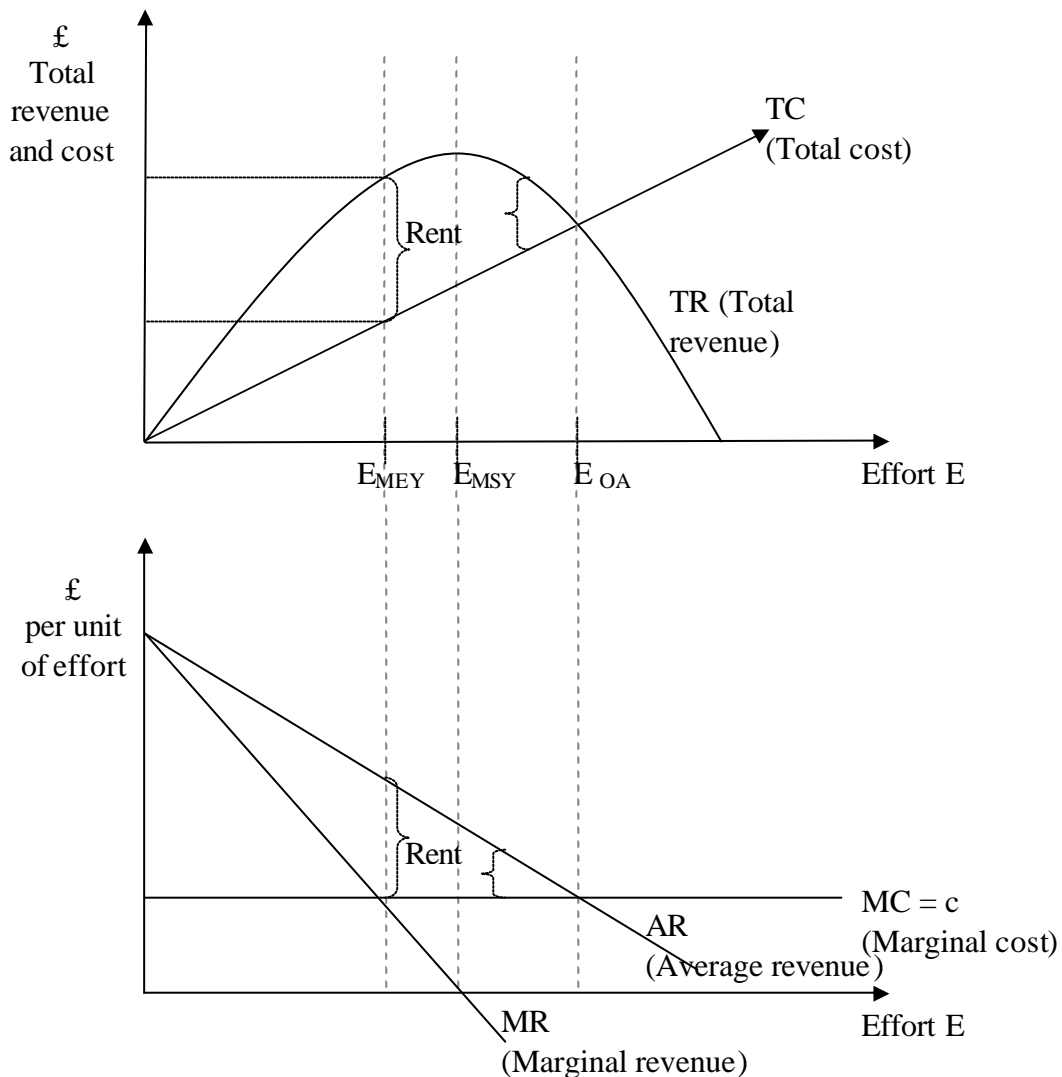
Figure inspired from Hartwick and Olewiler 1998

This drawing shows graphically how the recourse rent (Rent) is lost in an open access fishery. The vessels income, the difference between their income (Total Revenue) and all their costs (Total Cost) are shown as the area above the TC line, below the TR curve. Here lies the assumption that the Red King Crab fishery, as it is done in Norway today is placed somewhere between the E_{MEY} (effort on maximum economical yield) and the E_{MSY} (effort on maximum sustainable yield) line. This assumption is based on the fact that the price last year (2003) was lower than the price the year before (Norges Råfisklag, 2003). The effort in the fishery has risen due to higher quotas, following lower prises due to lower demand. I believe we are still to the left of E_{MSY} because the scientists have stated that there still are

possibilities to raise the Red King Crab quotas without reducing the stock.

Hence we are in a state of the fishery where the resource rent is very high. In this state the fishermen who are not allowed to fish the crab is in a position where they very much would like to take part in this, in their eyes, Klondike fishery. If there are opened for a free fishery in some areas like west of Magerøya, many fishermen in addition to those which already fish on quotas will enter the fishery. They will enter and participate in the fishery bringing effort up along the effort line until they pass the point where there still is resource rent in the fishery. After passing this line some fishermen will not earn money and drop out. Some will drop out finding better paid fishery or other kinds of work or social security funds. The remaining fishers will stabilize the effort on the point of E_{OA} (Effort of open access fishery).

This does not guarantee that the remaining fishers still fishing west of Magerøya puts enough effort into the fishery to keep the stock low, or even make the stock into extinction which supposedly is the aim of letting there be open access fishery in the area west of Magerøya.

6.1.2 Giving special rights to fish west of the border

Another regime that the Minister of Fisheries mentions in his speech is a regime with strict restrictions for the fishers attending the fishery after application having rules that forces the fishermen to find alternative uses for the crab other than sale on the ordinary market.

This might give protection for the ordinary crab market, keeping the prices high prises as he states. On the other hand there might be that the fishermen don't earn enough money on this regime to bother with crab fishing. If the aim is to reduce or drive the crab west of the border into extinction there should be incentives to get rid of not only the large commercial crabs, but also the small non-commercial ones. If there is demand for these crabs outside the food consumption demand industry there may be that this could be a commercially viable fishery in other areas. There are possibilities that the research will uncover other uses for the crab, like using the waste in some industry purpose. There are examples of using waste from the shrimp industry to make cosmetics and medicine. If so, in the future there might be a market for non-commercial crabs. But so far we haven't got there.

6.1.3 Tourism fishery west of the border

Finally, the Minister of Fishery states that tourist fishing might be a solution west of the border. The tourist industry is already very interested in using the Red King Crab as a lure to bring the tourists to Finnmark. The tourist industry has been given a quota of 1000 crabs to use for tourist fishing. A tourist fishery west of the border might be a good idea. The tourists would like to fish the crab, not only to eat it, but also as a curiosity, just to look at it. They might want to bring small dead species home with them. A large tourist fishery will give benefits for the tourist industry as well as reducing the amount of crabs in the area.

There is a limit to this too, as most tourists would like to fish in the summer, when the weather is good and they have their holidays off. The crab is best filled later in the year from October to December, a time when most tourists are back at work.

6.1.4 Introducing a bounty on Red King Crab delivery west of the border

The Minister of Fisheries did not mention introducing a bounty on Red King Crab west of Magerøy as one of the regimes possible when he spoke under the meeting on this problem in Alta in April 5th 2004. There are others though that has mentioned it as a possibility, so I will comment a bit about it.

If the suggestions above to limit the amount of Red King Crab East of Magerøya is not enough to fish the crabs into extinction, there might be useful to introduce some kind of subsidies into the fishery.

From Figure 1 above we have that in the point E_{OA}, the point of effort which gives open access fishery, which is another expression of free fishery. The level of effort chosen under open access depends on where TC = TR. The open access equilibrium can also be defined in terms of average and marginal costs of harvest. The equilibrium condition can be written as pH = aE, where p is the price on the crabs, H is the harvest size, a is the cost of the fishery and E is the effort put into the fishery. Dividing by H, we see that

p = aE/H

that is, price equals the average cost of the harvest. Vessels will enter the fishery under open access as long as price exceeds average cost. (Hartwick and Olewiler 1998)

Let us find open-access effort level for the Gordon-Shafer model. As we see in figure 1 are bioeconomic equilibrium under open-access marginal cost MC = average revenue AR. We can define this as

$$E_{OA} = r/q(1-(a/pqK))$$

where r is the intrinsic growth rate for the stock of Red King Crab, q is a constant, a is the unit cost of harvest, p is the price of Red King Crab and K is the caring capacity. This shows that fisheries based on biologically highly productive resources with high r and K as Red King Crab is may sustain a large fishing effort under open-access. If there are high prices on Red King Crab and low costs in the fishery, the E_{OA} will be at a point when fishery might bring the Red King Crab to extinction. But if the prices fall as they do if there is enough crabs on the market and the costs increases when fishing up the crabs where there are fewer large crabs around might not give incentives enough to fish up the Red King Crab west of the western border. (Flaaten 2004).

We see that if the price falls below the costs in doing the fishery, the fishery will stop. To stimulate fishery to bring extinction of the Crab even if prices fall dramatically we might need to use subsidies like a bounty on fishing Red King Crab.

A bounty on the crab may give equal price for the crab no matter size, gender or flesh fullness in the claws. This will secure that not only the large and commercial valuable crabs are brought to land, but all crabs being a part of the spreading.

There is a question though on how large the bounty should be. And should the bounty be for all crabs, also the valuable ones?

The fishermen would wish to get market price for the large crabs, and a smaller bounty for the rest. But then we are back to the problem just discussed. This might reduce the price for the Crabs in the ordinary fishery.

There are two ways to set the bounty. One way is to set the bounty so high that the vessels get incentive to fish specially on the crab. This might be an issue if the Governments goal is to get rid of the crab in the area no matter costs. It's a question still on how small the crabs can be for getting the bounty. As the baby crabs (juveniles) are pelagic there is a scenario of bringing them up with trawl nets used for copepods (zooplankton) and get paid equal bounty for the baby crabs too, and then it will be a question on the job of counting them.

Another way of setting the bounty is to set it low enough to not bring up a open access fishery, but large enough to make the fishers bring to land the crabs that they get as a unscheduled secondary catch in other fisheries, as they already is supposed to do.

I guess a middle way is a possibility to handle the question. To introduce a bounty where nobody gets rich, but high enough to make incentives for the ones that don't have anything else to do. For the ones that have fished up their other quotas this might be an ok occupation. It is also possibilities to make this an ok summer job for the students.

I will not put one of the abovementioned regimes up as better than the others as I don't believe one way of regulating the spreading of the Red King Crab west of Magerøy is enough to prevent the spreading. I believe that we have to use several means to get rid of the crab. Maybe a combination on free access in the parts of the year when the ordinary Red King Crab fishery is not active, special rights in the normal season, a small bounty and tourist fishery will be sensible?

7.   Conclusion

In this thesis I have looked into the profitability of the Red King Crab fishery in Northern Norway. When analyzing the accounts from vessels fishing Red King Crab up against comparable accounts from vessels not fishing Red King Crab I got some results for further use. I analyzed the accounts both by financial analysis tools and by statistical tools. I also looked into how much of the Red King Crab vessels income which depended on the Red King Crab fishery.

The quota of Red King Crab is given to those vessels that are defined as the vessels which has most trouble with the Red King Crab as by-catch in their other fisheries. This by-catch is said to give them extra costs as the crab destroys their fishing gears and their catch. As a compensation for this trouble they are given the quota to fish Red King Crab for sale.

I analyzed accounts from two years; 2001 and 2002, and from two groups of vessel sizes; 8-12.9 meters and 13 meters +. In the last group, 13 meters and above I run into some problems. The vessels fishing Red King Crab have to be between 8-15 meters in 2002. In 2001 a few boats fishing Red King Crab was above 15 meters as it still was a research fishery. It would probably be natural to keep the vessels together as one group size 8-15 meters in my study too, but I had to split them in two groups. The reason for this is the way the vessel sizes are divided in the annual Norwegian study of fishing vessel profitability which I use as comparing vessels. In this study the vessels sizes are divided in one group of vessels size 8-12.9 meters and another group of vessels from 13-20.9 meters. This gives me a good comparing on the vessels sized 8.12.9 meters, but gives some trouble when comparing the vessels from 13 meters and above as the Red King Crab vessels sizes are averagely smaller than the comparing vessels. Still the average difference is not so large between the two groups, as the comparing groups of vessels are vessels fishing with gillnets, hand line and long line. Most "large" vessels using these tools in Northern Norway are smaller vessels around 15-16 meters.

After making the analysis I can conclude that the smaller vessels do benefit from the Red King Crab fishery. They earn more than the vessels not fishing on Red King Crab and do better inn all the analysis where there are possible to get adequate answers. After looking closer into the accounts it seems like some of the smallest vessels do depend on the crab for their economical survival.

The larger vessels though does not benefit from the Red King Crab fishery compared to the vessels who not fish Red King Crab. In all the analysis there are no difference from the comparing group, in some analysis the comparing group of vessels are better off by not fish on the crab.

There are reason to believe that the larger the vessel, the less benefit they get from the Red King Crab fishery. This lies in the way the quota is shared between the boats. The quota for each boat is fixed and not depending on the vessel size. For 2002 every vessel in group I could fish 700 + 64 crabs while the boats in group II could fish 350 + 34 crabs (Fiskeridirektøren 2002). The only way to bring up the value is to concentrate on the largest crabs; most crabs delivered are around 4 kilos though. A small vessel depending on the income from the crab might have better time to select the largest crabs, while a larger vessel uses less time on this fishery to concentrate on other fishery to keep up the income. A larger vessel have larger expenses, and more crew to feed, so the fixed quota and no possibilities to get higher quota gives them incentives to look for other income in other fisheries more than a smaller vessel would.

I have also looked into the management of the Red King Crab west of Magerøya. The 26º East latitude is by the Norwegian and Russian authorities set as the border for stopping the spreading of the Red King Crab further west. This border gives challenges for the management of the Red King Crab in this area. I have looked into four different regimes for stopping the crab to spread west of Magerøy, three of them introduced by the Norwegian Minister of Fishery Svein Ludvigsen in a meeting in Alta April 5th 2004 and the fourth introduced by me in this thesis. The four regimes are;

- ☑ free access to fish Red King Crab west of the border,
- ☑ Giving special rights to fish west of the border
- ☑ Tourism fishery west of the border
- ☑ Introducing a bounty on Red King Crab delivery west of the border

I have pointed out some consequences of choosing them. I will not put one of the abovementioned regimes up as better than the others as I don't believe one way of regulating the spreading of the Red King Crab west of Magerøya is enough to prevent the spreading. I believe that we have to use several means to get rid of the Red King Crab in the areas we don't want them to habitat. Maybe a combination on all the mentioned regimes is sensible? Maybe give free access in the parts of the year when the ordinary Red King Crab fishery is not active, special rights in the normal season, a small bounty the year around and tourist fishery when the tourists are here?

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9.   Appendix

Appendix 1: A map over Finnmark County, Magerøya and Nordkapp

In this thesis Magerøy has been mentioned some times regarding the western border for the spreading of the Red King Crab. These maps from a presentation from the Ministry of Fisheries show the western border at longitude 26° east.

Verdier fra havet - Norges framtid

Norwegian Ministry of Fisheries
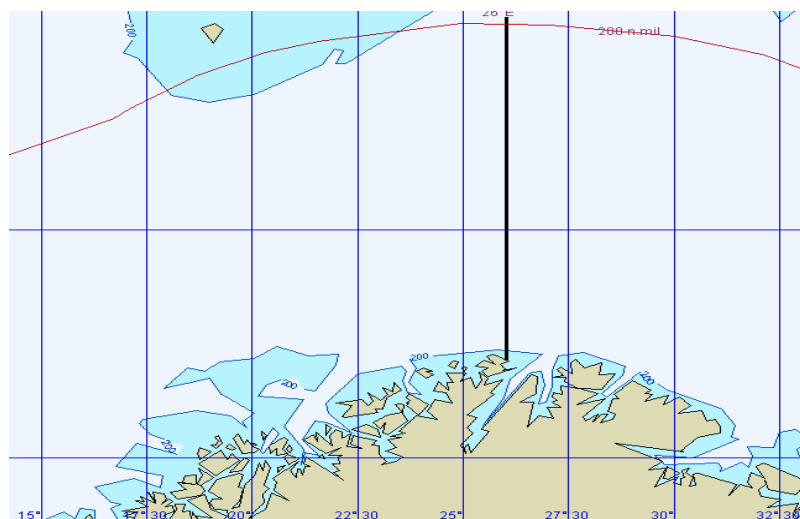
Vestgrensen

26°Ø – Vestgrensen - Magerøya
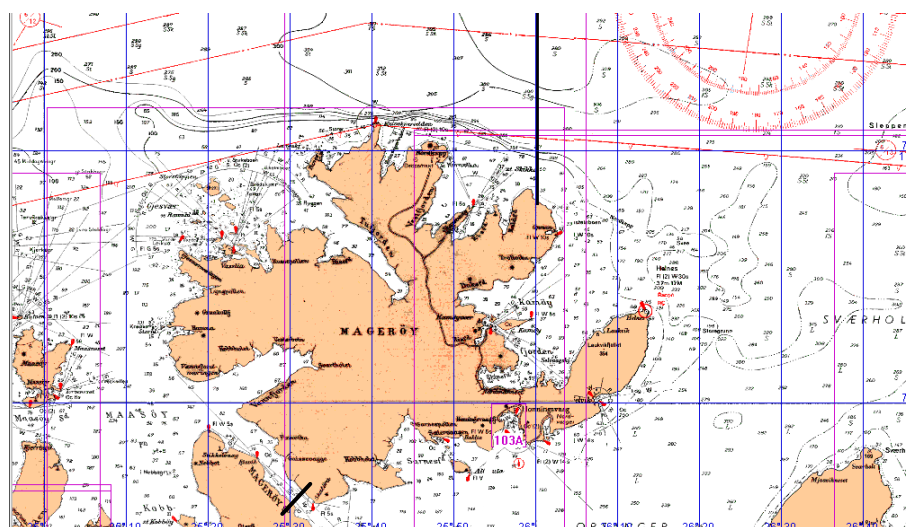
Appendix 2: Tables used from the annual Norwegian study of fishing vessel profitability 2002 and 2001.

Tabell G 7

Driftsresultater fordelt etter driftskombinasjon 2002
Garn- og juksafiske. Fartøy 8-12,9 m st.l. fra Nord-Norge.
Gjennomsnitt pr. fartøy.

```
Fartøygruppe 001                          BALANSE
RESULTATREGNSKAP                          B. 1 Bokført verdi fartøy (ber.)   296 212
R. 1 Driftsinntekter            680 784   B. 2 Andre varige driftsmidler      41 886
R. 2 Drivstoff                   27 804   B. 3 Sum varige driftsmidler       338 098
R. 3 Produktavgift               22 316   B. 4 Div. omløpsmidler              23 717
R. 4 Agn, is, salt og emb.        3 426   B. 5 Kontanter, bankinnskudd       147 725
R. 5 Sosiale kostnader            1 929   B. 6 Sum omløpsmidler              171 442
R. 6 Forsikring fartøy           15 649   B. 7 Sum eiendeler                 509 540
R. 7 Andre fors. (inkl. pakkefors.) 4 354 B. 8 Egenkapital (ber.)            191 990
R. 8 Vedlikehold fartøy          72 115   B. 9 Pantegjeld i SND               32 999
R. 9 Vedl./nyansk. redskap       41 367   B.10 Valutalån                          0
R.10 Div. usp. kostnader         52 651   B.11 Annen langs. gjeld (inkl. US) 220 441
R.11 Kostnader til proviant       9 941   B.12 Sum langsiktig gjeld          253 441
R.12 Arbeidsgodtgj. til mannskap 355 181  B.13 Driftskreditt                  1 945
R.13 Ber. avskr. på fartøy (HK)  30 230   B.14 Leverandørgjeld                21 373
R.14 Sum driftskostnader        636 963   B.15 Annen kortsiktig gjeld         40 792
R.15 Driftsresultat              43 821   B.16 Sum kortsiktig gjeld           64 109
R.17 Div. finansinntekter         6 698   B. 17 Sum egenkapital og gjeld     509 540
R.18 Agio                             0
R.19 Sum finansinntekter          6 698   FARTØYPARAMETRE
R.20 Div. finanskostnader        20 527   P. 1 Gjsn. lengde i m st.l.         10,36
R.21 Disagio                          0   P. 2 Gjsn. størrelse i TE
R.22 Sum finanskostnader         20 527   P. 3 Gjsn. størrelse i BRT             11
R.23 Netto finansposter         -13 830   P. 4 Gjsn. alder                    20,85
R.24 Ordinært resultat før skatt 29 991
L. 1 Lønnsevne i alt            360 573   P. 5 Antall fartøy i utvalg           122
L. 2 Lottutbetaling i alt       355 056   P. 6 Antall fartøy i masse            558
```

Opplysninger om førstehåndsverdi[1] og fangstmengde[1] for de viktigste fiskeslag for alle[2] fartøy i fartøygruppe 001.

FISKESLAG	VERDI (1 000 kr)	TONN (RUND VEKT)				GJ.SNITT PRIS
		Totalt	Nord for 62°[3]	Nordsjøen/ Skagerrak [4]	Andre områder [5]	
TORSK	256 318	21 309	21 273	37	0	12,03
SEI	28 928	6 973	6 955	19	0	4,15
HYSE	23 115	2 583	2 580	3	0	8,95
KRABBE	19 006	558	558	0	0	34,06
UER	8 055	1 122	1 115	7	0	7,18
ROGNKJEKS	6 561	1 452	1 452	0	0	4,52
KVEITE	5 157	127	127	0	0	40,47
BREIFLABB	5 059	201	194	8	0	25,11
MAKRELL	5 051	936	21	915	0	5,4
BLÅKVEITE	4 591	411	411	0	0	11,17
ANDRE FISKESLAG	13 932	2 723	2 712	11	0	5,12
TOTALT	**375 773**	**38 396**	**37 397**	**998**	**0**	**9,79**

[1] Hentet fra Fiskeridirektoratets sluttseddelregister. Foreløpige tall.
[2] Omfatter alle helårsdrevne fartøy i korrigert masse.
[3] ICES-kodene I, IIa og IIb.
4) ICES-kodene III, IVa, IVb og IVc.

Tabell G 8

Driftsresultater fordelt etter driftskombinasjon 2002
Garn- og juksafiske. Fartøy 13-20,9 m st.l. fra Nord-Norge.
Gjennomsnitt pr. fartøy.

```
Fartøygruppe 002                               BALANSE
RESULTATREGNSKAP                               B. 1 Bokført verdi fartøy (ber.)   1 009 157
R. 1 Driftsinntekter             1 902 803     B. 2 Andre varige driftsmidler        111 590
R. 2 Drivstoff                      83 942     B. 3 Sum varige driftsmidler        1 120 746
R. 3 Produktavgift                  61 529     B. 4 Div. omløpsmidler                 46 751
R. 4 Agn, is, salt og emb.          11 189     B. 5 Kontanter, bankinnskudd          339 730
R. 5 Sosiale kostnader               5 822     B. 6 Sum omløpsmidler                 386 482
R. 6 Forsikring fartøy              43 094     B. 7 Sum eiendeler                  1 507 228
R. 7 Andre fors. (inkl. pakkefors.) 33 750     B. 8 Egenkapital (ber.)              -133 521
R. 8 Vedlikehold fartøy            168 630     B. 9 Pantegjeld i SND                 186 688
R. 9 Vedl./nyansk. redskap         136 262     B.10 Valutalån                        100 308
R.10 Div. usp. kostnader           130 865     B.11 Annen langs. gjeld (inkl. US)  1 068 744
R.11 Kostnader til proviant         21 041     B.12 Sum langsiktig gjeld           1 355 740
R.12 Arbeidsgodtgj. til mannskap   856 136     B.13 Driftskreditt                     17 576
R.13 Ber. avskr. på fartøy (HK)    119 328     B.14 Leverandørgjeld                   58 271
R.14 Sum driftskostnader         1 671 588     B.15 Annen kortsiktig gjeld           209 162
R.15 Driftsresultat                231 215     B.16 Sum kortsiktig gjeld             285 009
R.17 Div. finansinntekter           19 412     B. 17 Sum egenkapital og gjeld      1 507 228
R.18 Agio                           13 735
R.19 Sum finansinntekter            33 147     DRIFTSINTENSITETSMÅL
R.20 Div. finanskostnader          120 781     D. 1 Sum antall driftsdøgn              240
R.21 Disagio                             0     D. 2 Sum antall døgn i sjøen            172
R.22 Sum finanskostnader           120 781
R.23 Netto finansposter            -87 634     FARTØYPARAMETRE
R.24 Ordinært resultat før skatt   143 581     P. 1 Gjsn. lengde i m st.l.            15,48
                                               P. 2 Gjsn. størrelse i TE
L. 1 Lønnsevne i alt               931 385     P. 3 Gjsn. størrelse i BRT                29
L. 2 Lottutbetaling i alt          804 672     P. 4 Gjsn. alder                       25,44
P. 5 Antall fartøy i utvalg             23
P. 6 Antall fartøy i masse             206
```

Opplysninger om førstehåndsverdi[1] og fangstmengde[1] for de viktigste fiskeslag for <u>alle</u>[2] fartøy i fartøygruppe 002.

| FISKESLAG | VERDI (1 000 kr) | TONN (RUND VEKT) | | | | GJ.SNITT PRIS |
		Totalt	Nord for 62°[3]	Nordsjøen/ Skagerrak [4]	Andre områder [5]	
TORSK	240 069	18 279	18 279	0	0	13,13
SEI	40 091	9 782	9 782	0	0	4,10
SILD	27 878	10 426	10 426	0	0	2,67
HYSE	21 532	2 395	2 395	0	0	8,99
BLÅKVEITE	12 277	1 125	1 125	0	0	10,91
UER	11 666	1 672	1 672	0	0	6,98
BREIFLABB	6 031	244	244	0	0	24,70
LANGE	5 673	529	529	0	0	10,72
KRABBE	4 359	57	57	0	0	76,69
BROSME	3 313	545	545	0	0	6,08
ANDRE FISKESLAG	8 292	982	858	124	0	8,45
TOTALT	**381 182**	**46 036**	**45 912**	**124**	**0**	**8,28**

[1] Hentet fra Fiskeridirektoratets sluttseddelregister. Foreløpige tall.
[2] Omfatter alle helårsdrevne fartøy i korrigert masse.
[3] ICES-kodene I, IIa og IIb.
[4] ICES-kodene III, IVa, IVb og IVc.

Tabell G 11

Driftsresultater fordelt etter driftskombinasjon 2002
Linefiske. Fartøy 8-12,9 m st.l. fra Nord-Norge.
Gjennomsnitt pr. fartøy.

```
Fartøygruppe 005                              BALANSE
RESULTATREGNSKAP                              B. 1 Bokført verdi fartøy (ber.)   225 824
R. 1 Driftsinntekter              677 514     B. 2 Andre varige driftsmidler      50 546
R. 2 Drivstoff                     20 225     B. 3 Sum varige driftsmidler       276 370
R. 3 Produktavgift                 22 115     B. 4 Div. omløpsmidler              10 097
R. 4 Agn, is, salt og emb.         19 543     B. 5 Kontanter, bankinnskudd        90 519
R. 5 Sosiale kostnader              2 237     B. 6 Sum omløpsmidler              100 616
R. 6 Forsikring fartøy             16 413     B. 7 Sum eiendeler                 376 986
R. 7 Andre fors. (inkl. pakkefors.) 2 187     B. 8 Egenkapital (ber.)            -32 863
R. 8 Vedlikehold fartøy            54 994     B. 9 Pantegjeld i SND               35 048
R. 9 Vedl./nyansk. redskap         35 094     B.10 Valutalån                           0
R.10 Div. usp. kostnader           67 803     B.11 Annen langs. gjeld (inkl. US) 304 713
R.11 Kostnader til proviant        10 202     B.12 Sum langsiktig gjeld          339 760
R.12 Arbeidsgodtgj. til mannskap  350 952     B.13 Driftskreditt                   5 241
R.13 Ber. avskr. på fartøy (HK)    25 633     B.14 Leverandørgjeld                13 114
R.14 Sum driftskostnader          627 399     B.15 Annen kortsiktig gjeld         51 734
R.15 Driftsresultat                50 115     B.16 Sum kortsiktig gjeld           70 088
R.17 Div. finansinntekter           4 896     B. 17 Sum egenkapital og gjeld     376 986
R.18 Agio                               0
R.19 Sum finansinntekter            4 896     FARTØYPARAMETRE
R.20 Div. finanskostnader          30 997     P. 1 Gjsn. lengde i m st.l.          10,39
R.21 Disagio                            0     P. 2 Gjsn. størrelse i TE
R.22 Sum finanskostnader           30 997     P. 3 Gjsn. størrelse i BRT              10
R.23 Netto finansposter           -26 102     P. 4 Gjsn. alder                     23,16
R.24 Ordinært resultat før skatt   24 013

L. 1 Lønnsevne i alt              355 036
L. 2 Lottutbetaling i alt         350 203
P. 5 Antall fartøy i utvalg            47
P. 6 Antall fartøy i masse            212
```

Opplysninger om førstehåndsverdi[1] og fangstmengde[1] for de viktigste fiskeslag for alle[2] fartøy i fartøygruppe 005.

FISKESLAG	VERDI (1 000 kr)	TONN (RUND VEKT)				GJ.SNITT PRIS
		Totalt	Nord for 62°[3]	Nordsjøen/ Skagerrak [4]	Andre områder [5]	
TORSK	89 609	7 407	7 407	0	0	12,1
HYSE	33 553	3 599	3 599	0	0	9,32
BLÅKVEITE	4 560	430	430	0	0	10,61
SEI	3 486	862	862	0	0	4,04
BROSME	3 363	606	605	0	0	5,55
ROGNKJEKS	1 817	374	374	0	0	4,86
KRABBE	1 778	71	71	0	0	24,89
KVEITE	902	23	23	0	0	38,88
STEINBIT	888	153	153	0	0	5,8
SILD	768	247	247	0	0	3,11
ANDRE FISKESLAG	1 650	211	170	40	0	7,83
TOTALT	142 376	13 983	13 942	41	0	10,18

[1] Hentet fra Fiskeridirektoratets sluttseddelregister. Foreløpige tall.
[2] Omfatter alle helårsdrevne fartøy i korrigert masse[3]
[3] ICES-kodene I, IIa og IIb.
[4] ICES-kodene III, IVa, IVb og Ivc.
[5] Residualpost.

Tabell G 12

Driftsresultater fordelt etter driftskombinasjon 2002

Linefiske. Fartøy 13-20,9 m st.l. fra Nord-Norge.
Gjennomsnitt pr. fartøy.

```
Fartøygruppe 006                             BALANSE
RESULTATREGNSKAP                             B. 1 Bokført verdi fartøy (ber.)   1 133 428
                                             B. 2 Andre varige driftsmidler        176 414
R. 1 Driftsinntekter           1 761 268     B. 3 Sum varige driftsmidler        1 309 842
R. 2 Drivstoff                    80 842     B. 4 Div. omløpsmidler                 81 084
R. 3 Produktavgift                53 805     B. 5 Kontanter, bankinnskudd          256 380
R. 4 Agn, is, salt og emb.        50 805     B. 6 Sum omløpsmidler                 337 464
R. 5 Sosiale kostnader             6 787     B. 7 Sum eiendeler                  1 647 306
R. 6 Forsikring fartøy            30 286     B. 8 Egenkapital (ber.)              -349 972
R. 7 Andre fors. (inkl. pakkefors.) 26 002   B. 9 Pantegjeld i SND                       0
R. 8 Vedlikehold fartøy          210 784     B.10 Valutalån                              0
R. 9 Vedl./nyansk. redskap        86 687     B.11 Annen langs. gjeld (inkl. US)  1 419 350
R.10 Div. usp. kostnader         158 954     B.12 Sum langsiktig gjeld           1 419 350
R.11 Kostnader til proviant       21 719     B.13 Driftskreditt                     26 801
R.12 Arbeidsgodtgj. til mannskap 810 236     B.14 Leverandørgjeld                  219 124
R.13 Ber. avskr. på fartøy (HK)  114 351     B.15 Annen kortsiktig gjeld           332 004
R.14 Sum driftskostnader       1 651 257     B.16 Sum kortsiktig gjeld             577 929
R.15 Driftsresultat              110 010     B. 17 Sum egenkapital og gjeld      1 647 306
R.17 Div. finansinntekter         11 541
R.18 Agio                              0     DRIFTSINTENSITETSMÅL
R.19 Sum finansinntekter          11 541     D. 1 Sum antall driftsdøgn               248
R.20 Div. finanskostnader        138 572     D. 2 Sum antall døgn i sjøen             147
R.21 Disagio                           0
R.22 Sum finanskostnader         138 572     FARTØYPARAMETRE
R.23 Netto finansposter         -127 032     P. 1 Gjsn. lengde i m st.l.            14,92
R.24 Ordinært resultat før skatt -17 021     P. 2 Gjsn. størrelse i TE
                                             P. 3 Gjsn. størrelse i BRT                24
L. 1 Lønnsevne i alt             819 375     P. 4 Gjsn. Alder                       31,98
L. 2 Lottutbetaling i alt        752 323
P. 5 Antall fartøy i utvalg           11
P. 6 Antall fartøy i masse           100
```

Opplysninger om førstehåndsverdi[1] og fangstmengde[1] for de viktigste fiskeslag for <u>alle</u>[2] fartøy i fartøygruppe 006.

FISKESLAG	VERDI (1 000 kr)	TONN (RUND VEKT)				GJ.SNITT PRIS
		Totalt	Nord for 62°[3]	Nordsjøen/ Skagerrak [4]	Andre områder [5]	
TORSK	99 929	7 927	7 924	3	0	12,61
HYSE	39 055	4 301	4 301	1	0	9,08
BLÅKVEITE	8 292	762	757	5	0	10,89
BROSME	3 532	604	603	0	0	5,85
SEI	2 718	650	650	0	0	4,18
KRABBE	2 350	31	31	0	0	76,57
STEINBIT	1 287	207	207	0	0	6,20
KVEITE	1 063	26	26	0	0	40,90
UER	977	144	144	0	0	6,79
LANGE	692	70	69	0	0	9,95
ANDRE FISKESLAG	1 306	119	115	4	0	10,97
TOTALT	**161 199**	**14 840**	**14 827**	**13**	**0**	**10,86**

[1] Hentet fra Fiskeridirektoratets sluttseddelregister. Foreløpige tall.
[2] Omfatter alle helårsdrevne fartøy i korrigert masse.
[3] ICES-kodene I, IIa og IIb.
[4] ICES-kodene III, IVa, IVb og IVc.
[5] Residualpost.

Tabell G 7

Driftsresultater fordelt etter driftskombinasjon 2001

Garn- og juksafiske. Fartøy 8-12,9 m st.l. fra Nord-Norge.
Gjennomsnitt pr. fartøy.

Fartøygruppe 001

RESULTATREGNSKAP

		BALANSE	
R. 1 Driftsinntekter	535 724	B. 1 Bokført verdi fartøy (ber.)	199 593
R. 2 Drivstoff	28 096	B. 9 Pantegjeld i SND	11 269
R. 3 Produktavgift	19 992	B.10 Valutalån	0
R. 4 Agn, is, salt og emb.	2 338	B.11 Annen langs. gjeld (inkl. US)	183 618
R. 5 Sosiale kostnader	1 449	B.12 Sum langsiktig gjeld	194 887
R. 6 Forsikring fartøy	13 199		
R. 7 Andre fors. (inkl. pakkefors.)	4 969	B.13 Driftskreditt	5 151
R. 8 Vedlikehold fartøy	48 534	B.14 Leverandørgjeld	8 328
R. 9 Vedl./nyansk. redskap	45 663	B.15 Annen kortsiktig gjeld	32 153
R.10 Div. usp. kostnader	34 772	B.16 Sum kortsiktig gjeld	45 633
R.11 Kostnader til proviant	10 619		
R.12 Arbeidsgodtgj. til mannskap	265 755		
R.13 Ber. avskr. på fartøy (HK)	23 483	FARTØYPARAMETRE	
R.14 Sum driftskostnader	498 870		
		P. 1 Gjsn. lengde i m st.l.	10,09
R.15 Driftsresultat	36 854	P. 2 Gjsn. størrelse i TE	
		P. 3 Gjsn. størrelse i BRT	10
R.17 Div. finansinntekter	6 117	P. 4 Gjsn. alder	20,94
R.18 Agio	0		
R.19 Sum finansinntekter	6 117		
R.20 Div. finanskostnader	19 117		
R.21 Disagio	0		
R.22 Sum finanskostnader	19 117		
R.23 Netto finansposter	-13 000		
R.24 Ordinært resultat før skatt	23 855		
L. 1 Lønnsevne i alt	272 336		
L. 2 Lottutbetaling i alt	265 055		
P. 5 Antall fartøy i utvalg	96		
P. 6 Antall fartøy i masse	439		

Tabell G 8

Driftsresultater fordelt etter driftskombinasjon 2001

Garn- og juksafiske. Fartøy 13-20,9 m st.l. fra Nord-Norge. Gjennomsnitt pr. fartøy.

Fartøygruppe 002

RESULTATREGNSKAP		BALANSE	
R. 1 Driftsinntekter	2 011 701	B. 1 Bokført verdi fartøy (ber.)	922 150
		B. 2 Andre varige driftsmidler	203 346
R. 2 Drivstoff	99 481	B. 3 Sum varige driftsmidler	1 125 496
R. 3 Produktavgift	75 658		
R. 4 Agn, is, salt og emb.	5 504	B. 4 Div. omløpsmidler	59 004
R. 5 Sosiale kostnader	7 179	B. 5 Kontanter, bankinnskudd	387 544
R. 6 Forsikring fartøy	37 894	B. 6 Sum omløpsmidler	446 549
R. 7 Andre fors. (inkl. pakkefors.)	36 201		
R. 8 Vedlikehold fartøy	186 223	B. 7 Sum eiendeler	1 572 044
R. 9 Vedl./nyansk. redskap	153 087		
R.10 Div. usp. kostnader	124 903	B. 8 Egenkapital (ber.)	227 359
R.11 Kostnader til proviant	22 680		
R.12 Arbeidsgodtgj. til mannskap	982 369	B. 9 Pantegjeld i SND	14 688
R.13 Ber. avskr. på fartøy (HK)	101 011	B.10 Valutalån	0
R.14 Sum driftskostnader	1 832 190	B.11 Annen langs. gjeld (inkl. US)	1 006 843
		B.12 Sum langsiktig gjeld	1 021 531
R.15 Driftsresultat	179 511		
		B.13 Driftskreditt	12 908
R.17 Div. finansinntekter	22 309	B.14 Leverandørgjeld	64 996
R.18 Agio	0	B.15 Annen kortsiktig gjeld	245 251
R.19 Sum finansinntekter	22 309	B.16 Sum kortsiktig gjeld	323 155
R.20 Div. finanskostnader	97 484	B. 17 Sum egenkapital og gjeld	1 572 044
R.21 Disagio	0		
R.22 Sum finanskostnader	97 484	DRIFTSINTENSITETSMÅL	
R.23 Netto finansposter	-75 175	D. 1 Sum antall driftsdøgn	276
		D. 2 Sum antall døgn i sjøen	177
R.24 Ordinært resultat før skatt	104 336		
		FARTØYPARAMETRE	
L. 1 Lønnsevne i alt	1 040 476		
L. 2 Lottutbetaling i alt	930 185	P. 1 Gjsn. lengde i m st.l.	15,33
		P. 2 Gjsn. størrelse i TE	
P. 5 Antall fartøy i utvalg	18	P. 3 Gjsn. størrelse i BRT	29
P. 6 Antall fartøy i masse	157	P. 4 Gjsn. Alder	25,62

Tabell G 11

Driftsresultater fordelt etter driftskombinasjon 2001

Linefiske. Fartøy 8-12,9 m st.l. fra Nord-Norge.
Gjennomsnitt pr. fartøy.

Fartøygruppe 005

RESULTATREGNSKAP		BALANSE	
R. 1 Driftsinntekter	658 574	B. 1 Bokført verdi fartøy (ber.)	242 577
R. 2 Drivstoff	25 347	B. 9 Pantegjeld i SND	33 830
R. 3 Produktavgift	24 350	B.10 Valutalån	0
R. 4 Agn, is, salt og emb.	16 786	B.11 Annen langs. gjeld (inkl. US)	192 778
R. 5 Sosiale kostnader	1 938	B.12 Sum langsiktig gjeld	226 608
R. 6 Forsikring fartøy	14 124		
R. 7 Andre fors. (inkl. pakkefors.)	4 984	B.13 Driftskreditt	4 137
R. 8 Vedlikehold fartøy	40 054	B.14 Leverandørgjeld	9 050
R. 9 Vedl./nyansk. redskap	42 152	B.15 Annen kortsiktig gjeld	63 717
R.10 Div. usp. kostnader	56 880	B.16 Sum kortsiktig gjeld	76 904
R.11 Kostnader til proviant	11 150		
R.12 Arbeidsgodtgj. til mannskap	338 839		
R.13 Ber. avskr. på fartøy (HK)	26 433	FARTØYPARAMETRE	
R.14 Sum driftskostnader	603 037		
		P. 1 Gjsn. lengde i m st.l.	10,34
R.15 Driftsresultat	55 537	P. 2 Gjsn. størrelse i TE	
		P. 3 Gjsn. størrelse i BRT	10
R.17 Div. finansinntekter	5 360	P. 4 Gjsn. alder	23,05
R.18 Agio	0		
R.19 Sum finansinntekter	5 360		
R.20 Div. finanskostnader	26 073		
R.21 Disagio	0		
R.22 Sum finanskostnader	26 073		
R.23 Netto finansposter	-20 713		
R.24 Ordinært resultat før skatt	34 824		
L. 1 Lønnsevne i alt	356 233		
L. 2 Lottutbetaling i alt	337 998		
P. 5 Antall fartøy i utvalg	58		
P. 6 Antall fartøy i masse	235		

Tabell G 12

Driftsresultater fordelt etter driftskombinasjon 2001

Linefiske. Fartøy 13-20,9 m st.l. fra Nord-Norge.
Gjennomsnitt pr. fartøy.

Fartøygruppe 006

RESULTATREGNSKAP		BALANSE	
R. 1 Driftsinntekter	1 745 824	B. 1 Bokført verdi fartøy (ber.)	477 116
		B. 2 Andre varige driftsmidler	38 251
R. 2 Drivstoff	61 277	B. 3 Sum varige driftsmidler	515 367
R. 3 Produktavgift	64 212		
R. 4 Agn, is, salt og emb.	36 655	B. 4 Div. omløpsmidler	81 691
R. 5 Sosiale kostnader	8 677	B. 5 Kontanter, bankinnskudd	337 615
R. 6 Forsikring fartøy	36 651	B. 6 Sum omløpsmidler	419 306
R. 7 Andre fors. (inkl. pakkefors.)	35 065		
R. 8 Vedlikehold fartøy	104 848	B. 7 Sum eiendeler	934 673
R. 9 Vedl./nyansk. redskap	70 780		
R.10 Div. usp. kostnader	129 360	B. 8 Egenkapital (ber.)	344 915
R.11 Kostnader til proviant	16 360		
R.12 Arbeidsgodtgj. til mannskap	903 203	B. 9 Pantegjeld i SND	16 021
R.13 Ber. avskr. på fartøy (HK)	75 411	B.10 Valutalån	0
R.14 Sum driftskostnader	1 542 499	B.11 Annen langs. gjeld (inkl. US)	272 822
		B.12 Sum langsiktig gjeld	288 843
R.15 Driftsresultat	203 325		
		B.13 Driftskreditt	7 638
R.17 Div. finansinntekter	13 952	B.14 Leverandørgjeld	15 067
R.18 Agio	0	B.15 Annen kortsiktig gjeld	278 211
R.19 Sum finansinntekter	13 952	B.16 Sum kortsiktig gjeld	300 916
R.20 Div. finanskostnader	33 917	B. 17 Sum egenkapital og gjeld	934 673
R.21 Disagio	0		
R.22 Sum finanskostnader	33 917	DRIFTSINTENSITETSMÅL	
R.23 Netto finansposter	-19 965	D. 1 Sum antall driftsdøgn	242
		D. 2 Sum antall døgn i sjøen	164
R.24 Ordinært resultat før skatt	183 359		
		FARTØYPARAMETRE	
L. 1 Lønnsevne i alt	1 048 839		
L. 2 Lottutbetaling i alt	887 306	P. 1 Gjsn. lengde i m st.l.	15,09
		P. 2 Gjsn. størrelse i TE	
P. 5 Antall fartøy i utvalg	9	P. 3 Gjsn. størrelse i BRT	24
P. 6 Antall fartøy i masse	84	P. 4 Gjsn. alder	33,24

Appendix 3: Tables prepared from the accounts given by the

Directorate of Fisheries and the annual study of fishing vessel profitability

As the annual Norwegian study of fishing vessel profitability does include the vessels fishing Red King Crab, I had to extract the Red King Crab vessels from the other vessels. The yellow column contains accounts for the vessels not fishing Red King Crab. The study also gives the accounts divided between vessels fishing with gillnets/hand line and vessels fishing with long line. I therefore made a weighted average for these two for the comparison with the Red King Crab vessels that comes from both these groups sorted by fishing methods.

Vessels 8-12.9 meters 2001

	Average 2001	Total 2001	Average RKC 2001	Total RKC 2001	Total 2001 - Tot RKC 2001	Average 2001 No RKC vessels
Operating revenues	**581 992**	**89 626 796**	**966 448**	**9 664 484**	**79 962 312**	**555 294**
Fuel and Lubrication oil	27 061	4 167 342	33 133	331 325	3 836 017	26 639
Product fee	21 633	3 331 532	36 238	362 383	2 969 149	20 619
Bait, ice, salt and packing	7 779	1 198 036	23 106	231 063	966 973	6 715
Social expences expenses	1 633	251 508	2 384	23 842	227 666	1 581
Insurance on vessel	13 547	2 086 296	17 231	172 307	1 913 989	13 292
Other insurances	4 975	766 096	8 131	81 305	684 791	4 755
Maintenance on vessel	45 340	6 982 396	57 275	572 754	6 409 642	44 511
Maintenance on gear	44 341	6 828 464	84 974	849 743	5 978 721	41 519
Other op. & adm. expenses	43 098	6 637 152	83 014	830 137	5 807 015	40 326
Provisions expenses	10 819	1 666 124	10 628	106 278	1 559 846	10 832
Labour wages and shares	293 280	45 165 142	461 124	4 611 240	40 553 902	281 624
Depreciation on vessel	24 594	3 787 482	35 028	350 276	3 437 206	23 869
Total operating expenses	**538 101**	**82 867 570**	**852 265**	**8 522 653**	**74 344 917**	**516 284**
Operating profit	**43 891**	**6 759 226**	**114 183**	**1 141 831**	**5 617 395**	**39 010**
Financial income	5 832	898 112	5 914	59 143	838 969	5 826
Total financial revenues	5 832	898 112	5 914	59 143	838 969	5 826
Financial cost	21 737	3 347 466	36 504	365 038	2 982 428	20 711
Total financial expenses	21 737	3 347 466	36 504	365 038	2 982 428	20 711
Result on financial intems	-15 905	-2 449 354	-30 590	-305 895	-2 143 459	-14 885
Profit activities before tax	**27 986**	**4 309 872**	**83 594**	**835 936**	**3 473 936**	**24 125**

	Average 2001	Total 2001	Average RKC 2001	Total RKC 2001	Total 2001 - Tot RKC 2001	Average 2001 No RKC vessels
Balance sheet						
Book value on vessel	*215 782*	*33 230 394*	*356 030*	*3 560 302*	*29 670 092*	*206 042*
Other tanible fixed assets	*0*	*0*	*38 376*	*383 758*	*-383 758*	*-2 665*
Total tangible fixed assets	*215 782*	*33 230 394*	*394 406*	*3 944 060*	*29 286 334*	*203 377*
Other current assets	*312 706*	*48 156 742*	*6 230*	*62 304*	*48 094 438*	*333 989*
Cash in hand and in the bank	*0*	*0*	*124 053*	*1 240 531*	*-1 240 531*	*-8 615*
Total current assets	*312 706*	*48 156 742*	*130 284*	*1 302 835*	*46 853 907*	*325 374*
Total assets	*528 488*	*81 387 136*	*524 690*	*5 246 895*	*76 140 241*	*528 752*
Equity (estimated)	*-405*	*-62 410*	*-5 988*	*-59 876*	*-2 534*	*-18*
Mortgage loans	*19 766*	*3 043 964*	*60 026*	*600 257*	*2 443 707*	*16 970*
Other long-term liabilities	*187 821*	*28 924 452*	*373 111*	*3 731 108*	*25 193 344*	*174 954*
Total long-term liabilities	*207 587*	*31 968 416*	*433 137*	*4 331 365*	*27 637 051*	*191 924*
Trade creditors	*8 600*	*1 324 388*	*9 092*	*90 919*	*1 233 469*	*8 566*
Other current liabilities	*312 706*	*48 156 742*	*88 449*	*884 487*	*47 272 255*	*328 280*
Total current liabilities	*321 306*	*49 481 130*	*97 541*	*975 406*	*48 505 724*	*336 845*
Total Equity and liabilities	***528 488***	***81 387 136***	***524 690***	***5 246 895***	***76 140 241***	***528 752***

Vessels 8-12.9 meters 2002

	Average 2002	Total 2002	Average RKC 2002	Total RKC 2002	Total 2002 - Tot RKC 2002	Average 2002 No RKC vessels
Operating revenues	**679 875**	**114 898 806**	**907 847**	**16 341 243**	**98 557 563**	**652 699**
Fuel and Lubrication oil	25 696	4 342 663	26 376	474 774	3 867 889	25 615
Product fee	22 260	3 761 957	28 941	520 935	3 241 022	21 464
Bait, ice, salt and packing	7 908	1 336 493	10 913	196 433	1 140 060	7 550
Social expenses	2 015	340 477	2 719	48 943	291 534	1 931
Insurance on vessel	15 861	2 680 589	21 526	387 465	2 293 124	15 186
Other insurances	3 751	633 977	5 194	93 495	540 482	3 579
Maintenance on vessel	67 354	11 382 748	85 077	1 531 394	9 851 354	65 241
Maintenance on gear	39 622	6 696 192	52 263	940 740	5 755 452	38 116
Other adm. expenses	56 865	9 610 163	77 620	1 397 159	8 213 004	54 391
Provisions expenses	10 014	1 692 296	11 455	206 183	1 486 113	9 842
Labour wages and shares	354 005	59 826 826	465 607	8 380 919	51 445 907	340 701
Depreciation on vessel	28 952	4 892 811	40 715	732 871	4 159 940	27 549
Total operating expenses	**634 303**	**107 197 192**	**828 406**	**14 911 311**	**92 285 881**	**611 165**
Operating profit	**45 572**	**7 701 614**	**79 441**	**1 429 932**	**6 271 682**	**41 534**
Financial income	6 197	1 047 268	12 401	223 226	824 042	5 457
Total financial revenues	6 197	1 047 268	12 401	223 226	824 042	5 457
Financial cost	23 439	3 961 153	26 259	472 656	3 488 497	23 103
Total financial expenses	23 439	3 961 153	26 259	472 656	3 488 497	23 103
Result on financial items	-17 242	-2 913 885	-13 857	-249 430	-2 664 455	-17 645
Profit activities before tax	**28 330**	**4 787 729**	**65 583**	**1 180 502**	**3 607 227**	**23 889**

Balance sheet						
Book value on vessel	*276 637*	*46 751 592*	*495 818*	*8 924 731*	*37 826 861*	*250 509*
Other tangible fixed assets	*44 294*	*7 485 754*	*58 778*	*1 058 005*	*6 427 749*	*42 568*
Total tangible fixed assets	*320 931*	*54 237 346*	*554 596*	*9 982 736*	*44 254 610*	*293 077*
Other current assets	*19 929*	*3 368 033*	*13 048*	*234 858*	*3 133 175*	*20 750*
Cash in hand and in the bank	*147 725*	*24 965 525*	*259 221*	*4 665 985*	*20 299 540*	*134 434*
Total current assets	*167 654*	*28 333 558*	*272 269*	*4 900 843*	*23 432 715*	*155 184*
Total assets	*488 585*	*82 570 904*	*826 866*	*14 883 579*	*67 687 325*	*448 260*
Equity (estimated)	*145 366*	*24 566 854*	*485 330*	*8 735 933*	*15 830 921*	*104 841*
Mortgage loans	*33 569*	*5 673 134*	*19 072*	*343 301*	*5 329 833*	*35 297*
Other long-term liabilities	*243 878*	*41 215 313*	*255 191*	*4 593 440*	*36 621 873*	*242 529*
Total long-term liabilities	*277 446*	*46 888 447*	*274 263*	*4 936 741*	*41 951 706*	*277 826*
Operating credit	*2 862*	*483 617*	*0*		*483 617*	*3 203*
Trade creditors	*19 076*	*3 223 864*	*14 800*	*266 393*	*2 957 471*	*19 586*
Other current liabilities	*43 835*	*7 408 122*	*52 473*	*944 512*	*6 463 610*	*42 805*
Total current liabilities	*65 773*	*11 115 603*	*67 273*	*1 210 905*	*9 904 698*	*65 594*
Total Equity & liabilities	***488 585***	***82 570 904***	***826 866***	***14 883 579***	***67 687 325***	***448 260***
Average over all length	10,37	1 752,25	11,25	202,52	1 549,73	10,26
GRT	10,72	1 812,00	12,39	223,00	1 589,00	10,52

Vessels 13 meters + in 2001

	Average 2001	Total 2001	Average RKC 2001	Total RKC 2001	Total 2001 - Tot RKC 2001	Average 2001 No RKC vessels
Operating revenues	**1 923 075**	**51 923 034**	**2 996 573**	**20 976 009**	**30 947 025**	**1 547 351**
Fuel and Lubrication oil	86 746	2 342 151	155 007	1 085 048	1 257 103	62 855
Product fee	71 843	1 939 752	110 473	773 309	1 166 443	58 322
Bait, ice, salt and packing	15 888	428 967	21 488	150 413	278 554	13 928
Social expences expenses	7 678	207 315	11 257	78 797	128 518	6 426
Insurance on vessel	37 480	1 011 951	67 188	470 316	541 635	27 082
Other insurances	35 822	967 203	40 545	283 815	683 388	34 169
Maintenance on vessel	159 098	4 295 646	204 988	1 434 916	2 860 730	143 037
Maintenance on gear	125 651	3 392 586	205 765	1 440 354	1 952 232	97 612
Other op. & adm. expences expenses	126 389	3 412 494	170 468	1 193 278	2 219 216	110 961
Provisions expences	20 573	555 480	28 692	200 845	354 635	17 732
Labour wages and shares	955 980	25 811 469	1 289 293	9 025 051	16 786 418	839 321
Depreciation on vessel	92 478	2 496 897	218 967	1 532 767	964 130	48 207
Total operating expences expenses	**1 735 626**	**46 861 911**	**2 524 130**	**17 668 909**	**29 193 002**	**1 459 650**
Operating profit	**187 449**	**5 061 123**	**472 443**	**3 307 100**	**1 754 023**	**87 701**
Financial income	19 523	527 130	20 312	142 181	384 949	19 247
Total financial revenues	19 523	527 130	20 312	142 181	384 949	19 247
Financial cost	76 295	2 059 965	230 817	1 615 717	444 248	22 212
Total financial expenses	76 295	2 059 965	230 817	1 615 717	444 248	22 212
Result on financial intems	-56 772	-1 532 835	-210 505	-1 473 536	-59 299	-2 965
Profit before taxation	**130 677**	**3 528 288**	**261 938**	**1 833 564**	**1 694 724**	**84 736**

Balance sheet						
Book value on vessel	*773 805*	*20 892 744*	*3 000 361*	*21 002 525*	*-109 781*	*-5 489*
Other tangible fixed assets	*148 314*	*4 004 487*	*229 294*	*1 605 059*	*2 399 428*	*119 971*
Total tangible fixed assets	*922 120*	*24 897 231*	*3 229 655*	*22 607 584*	*2 289 647*	*114 482*
Other current assets	*66 566*	*1 797 291*	*14 454*	*101 178*	*1 696 113*	*84 806*
Cash in hand and at in the bank	*370 901*	*10 014 327*	*762 577*	*5 338 041*	*4 676 286*	*233 814*
Total current assets	*437 467*	*11 811 618*	*777 031*	*5 439 219*	*6 372 399*	*318 620*
Total assets	*1 359 587*	*36 708 849*	*4 006 686*	*28 046 803*	*8 662 046*	*433 102*
Equity (estimated)	*266 544*	*7 196 697*	*1 159 163*	*8 114 144*	*-917 447*	*-45 872*
Mortgage loans	*15 132*	*408 573*	*659 699*	*4 617 895*	*-4 209 322*	*-210 466*
Other long-term liabilities	*762 169*	*20 578 572*	*1 613 776*	*11 296 434*	*9 282 138*	*464 107*
Total long-term liabilities	*777 302*	*20 987 145*	*2 273 476*	*15 914 329*	*5 072 816*	*253 641*
Operating credit	*11 151*	*301 086*	*0*	*0*	*301 086*	*15 054*
Trade creditors	*48 353*	*1 305 531*	*156 028*	*1 092 197*	*213 334*	*10 667*
Other current liabilities	*256 238*	*6 918 417*	*418 019*	*2 926 133*	*3 992 284*	*199 614*
Total current liabilities	*304 591*	*8 223 948*	*574 047*	*4 018 330*	*4 205 618*	*210 281*
Total Equity & liabilities	*1 359 587*	*36 708 849*	*4 006 686*	*28 046 803*	*8 662 046*	*433 102*
Days in operation	265	7 146	239	1 670	5 476	274
Average over all length	15,25	411,75	15,80	110,57	301,18	15,06
GRT	27,33	738,00	47,86	335,00	403,00	20,15

Vessels 13 meters + in 2002

	Average 2002	Total 2002	Average RKC 2002	Total RKC 2002	Total 2002 - Tot RKC 2002	Average 2002 No RKC vessels
Operating revenues	**1 857 012**	**63 138 417**	**2 574 908**	**7 724 723**	**55 413 694**	**1 787 539**
Fuel and Lubrication oil	82 939	2 819 928	131 320	393 960	2 425 968	78 257
Product fee	59 030	2 007 022	74 567	223 700	1 783 322	57 527
Bait, ice, salt and packing	24 006	816 202	95 615	286 844	529 358	17 076
Social expenses	6 134	208 563	5 686	17 059	191 504	6 178
Insurance on vessel	38 950	1 324 308	65 828	197 484	1 126 824	36 349
Other insurances	31 243	1 062 272	41 599	124 798	937 474	30 241
Maintenance on vessel	182 268	6 197 114	156 781	470 342	5 726 772	184 735
Maintenance on gear	120 223	4 087 583	130 067	390 201	3 697 382	119 270
Other adm. expenses	139 953	4 758 389	185 061	555 184	4 203 205	135 587
Provisions expenses	21 260	722 852	45 933	137 798	585 054	18 873
Labour wages and shares	841 286	28 603 724	1 009 443	3 028 328	25 575 396	825 013
Depreciation on vessel	117 718	4 002 405	368 204	1 104 613	2 897 792	93 477
Total operating expenses	**1 665 011**	**56 610 362**	**2 310 104**	**6 930 311**	**49 680 051**	**1 602 582**
Operating profit	**192 002**	**6 528 055**	**264 804**	**794 412**	**5 733 643**	**184 956**
Financial income	16 866	573 427	5 899	17 698	555 729	17 927
Agio	9 291	315 905	0	0	315 905	10 190
Total financial revenues	26 157	889 332	5 899	17 698	871 634	28 117
Financial cost	126 537	4 302 255	355 069	1 065 207	3 237 048	104 421
Total financial expenses	126 537	4 302 255	355 069	1 065 207	3 237 048	104 421
Result on financial intems	-100 380	-3 412 923	-349 170	-1 047 509	-2 365 414	-76 304
Profit before taxation	**91 622**	**3 115 132**	**-84 366**	**-253 097**	**3 368 229**	**108 653**
Balance sheet						
Book value on vessel	*1 049 362*	*35 678 319*	*4 688 531*	*14 065 593*	*21 612 726*	*697 185*
Other tangible fixed assets	*132 562*	*4 507 124*	*186 507*	*559 520*	*3 947 604*	*127 342*
Total tangible fixed assets	*1 181 925*	*40 185 443*	*4 875 038*	*14 625 113*	*25 560 330*	*824 527*
Other current assets	*57 859*	*1 967 197*	*93 960*	*281 881*	*1 685 316*	*54 365*
Cash in hand and in the bank	*312 764*	*10 633 970*	*141 643*	*424 929*	*10 209 041*	*329 324*
Total current assets	*370 623*	*12 601 167*	*235 603*	*706 810*	*11 894 357*	*383 689*
Total assets	*1 552 547*	*52 786 610*	*5 110 641*	*15 331 923*	*37 454 687*	*1 208 216*
Equity (estimated)	*-203 549*	*-6 920 675*	*668 446*	*2 005 338*	*-8 926 013*	*-287 936*
Mortgage loans	*126 289*	*4 293 824*	*0*	*0*	*4 293 824*	*138 510*
Foreign currency loan	*67 855*	*2 307 084*	*0*	*0*	*2 307 084*	*74 422*
Other long-term liabilities	*1 182 175*	*40 193 962*	*3 869 823*	*11 609 469*	*28 584 493*	*922 080*
Total long-term liabilities	*1 376 320*	*46 794 870*	*3 869 823*	*11 609 469*	*35 185 401*	*1 135 013*
Operating credit	*20 561*	*699 059*	*0*	*0*	*699 059*	*22 550*
Trade creditors	*110 312*	*3 750 597*	*238 725*	*716 174*	*3 034 423*	*97 885*
Other current liabilities	*248 905*	*8 462 770*	*333 647*	*1 000 942*	*7 461 828*	*240 704*
Total current liabilities	*379 777*	*12 912 426*	*572 372*	*1 717 116*	*11 195 310*	*361 139*
Total Equity & liabilities	***1 552 547***	***52 786 610***	***5 110 641***	***15 331 923***	***37 454 687***	***1 208 216***
Days in operation	243	8 248	282	847	7 401	239
Average over all length	15	520	14,44	43	477	15
GRT	27	931	33,67	101	830	27

Correction of table 1, in my Thesis:
The profitability and management of the Norwegian Red King Crab
(Paralithodes Camtschaticus) fishery

Tromsø 11. Feb.2005
Kari Wessel

2.5 Landed value of Red King Crabs
Table 1:   Landed value of Red King Crab from the start in 1994

Year	Quota # of crabs	# of vessels	Quantity kg	Value in NOK	Value pr Crab	Value pr vessel	Nationality
1994	11,000	4	31,846	1,114,610	101	278,653	Norwegian
			19,055	666,925			Russian
1995	11,000	5	32,383	1,162,235	106	232,447	Norwegian
1996	15,000	6	70,142	2,595,236	173	432,539	Norwegian
1997	15,000	6	70,698	2,615,826	174	435,971	Norwegian
1998	25,000	16	124,404	4,602,948	184	287,684	Norwegian
1999	37,500	24	202,435	9,819,379	262	409,141	Norwegian
2000	37,500	34	210,792	22,972,059	613	675,649	Norwegian
2001	75,000	123	433,554	34,320,565	458	279,029	Norwegian
2001			44,631	5,750,140			Russian
2002	100,000	135	414,388	31,594,266	316	234,032	Norwegian
			237,853	35,667,030			Russian
2003	200,000	194	823,299	58,900,017	295	303,608	Norwegian
			395,995	34,101,122			Russian
2004	280,000	259	1,281,869	80,909,761	289	312,393	Norwegian
			186,044	19,476,738			Russian