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Executive Summary

Background

In 1996, about 269,000 seals were killed in Canada, of which 242,000 were harp seals. Of the seals landed, about 25,000 pelts (2,065 harp seal whitecoats and 22,846 hooded seal bluebacks) were subsequently seized because they were allegedly taken in violation of the Marine Mammal Regulations.

Newfoundland and Labrador accounted for 94% of the total catch. The sealing industry claims output valued at close to $11-12 million but double and triple counted items in arriving at this figure. Some industry advocates have inflated the claims to $15-$20m.

Results

- The best estimate of the output of the entire industry in 1996 is $8.96m.
- Of this, $2.65m is needed to cover purchased inputs (ammunition, fuel, insurance etc.)
- Subtracting these expenses leaves only $6.31m of Value-added.
- Government subsidies for meat transport and processing amount to $1.72m.
- A further $1.67m is spent by governments on inspection, rescue, support of industry etc.
- Net potential benefits are now only $2.9m.
- Meat subsidies are 3-4 times larger than the value of the processed meat in the market. We are told 6.5 million pounds of meat was processed, that is 7.5 times more than in the previous year. Given that costs are many multiples of revenues, the gain to claiming subsidies but dumping the meat would have been huge.
- At least 30,290 penises were collected and processed. They account for $0.94 million. The Director General, Resource Management of the Department of Fisheries and Oceans (DFO) suggests the true figure could be as high as 50,000 penises.
- Without penises, Value-added by the hunt drops to $1.97m.
- For old harp seals, penises and meat subsidies cover fully 75% of the landed value paid to sealers.

Conclusion

- In 1996, Canadian taxpayers spent about 3.4 million dollars to subsidize the landing of seal meat, fund the Canadian Sealers' Association and finance other industry support and inspection services, etc.
- Value-added by the hunt is a mere .06% of the Gross Domestic Product of Newfoundland
- The commercial hunt only added the equivalent of 100-120 full-time jobs (.0006% of the 190,000 employed in Newfoundland). In essence, Canadian taxpayers are spending $28,250 - $33,900 for every full time position in the sealing industry.
- The sealing industry is heavily dependent on meat subsidies and the sale of seal penises. These constitute 55% of the revenue of sealers and boat owners after paying for fuel, ammunition, etc.
- If we eliminate seal meat subsidies, stop the trade in seal penises, and account for the true costs of labour and capital, the net value of the seal hunt to Canada as a whole is zero.

In essence, the answer to the question: *"Is the commercial seal hunt worth it?"* is no.

This report makes no attempt to calculate the "hidden" or tangible costs of the hunt, such as loss of tourism revenue due to damage to Canada's reputation.

In 1996, the year after subsidies were introduced, sealing was more intense than usual. According to official sources, some 268,921 seals were harvested in Canada, not including unreported kills or seals taken in the Arctic. Of these, 242,262 were harp seals, a huge increase over the usual annual catch, which for the last ten years averaged 55,000. Greenland, which traditionally takes about 15,000 harp seals may have landed between 40,000 and 50,000.[1] Some 2,065 illegal whitecoats were seized from processing facilities. Though the quota for hooded seals was 8,000[2], the catch was 25,754. Most of this was allegedly illegal hunting and processing of 22,846 bluebacks, which were also seized.[3]

Newfoundland Region (including Labrador) accounted for 252,758 or 94% of the total catch. DFO issued 8403 commercial sealing licences and 1031 licences for personal use in Newfoundland.[4] As found over many years, only a small fraction of the commercial licensees, some 600 or 7.1%, are believed to have actually participated for commercial purposes in the Newfoundland seal hunt, mostly on longliners. The average duration of employment on longliners was estimated at 4 weeks, longer than usual. Total employment is the equivalent of about 50 person-years of employment.[5] The total value of the catch to sealers is variously estimated (see Appendix A for discussion). We use the DFO estimate of legal sales of $5.7m of which $1.7m was in the form of meat subsidies [6] and $470 thousand was receipts for "organs", ie. an estimated 30,920 penises. With direct operating costs (fuel, ammunition, food, transport etc.) of $1.783m, net earnings were $3.917m according to figures provided by the Canadian Sealers' Association.[7] If 20% of the net revenue goes to the boat, the implication is that sealers earned $5,290 each or $1,323 per work week. This is comparable to the revenue sealers have received in previous years.[8]

[1]Unless otherwise stated, all figures in this study are taken from official DFO documents that were obtained through Access to Information legislation. Documents are available upon request.

[2]DFO Memorandum to the Minister: 1997 Seal Management Measures, dated Nov. 29th, 1996. On the basis of these numbers the Minister announces a Total Allowable Catch (TAC) of 275,000 harp seals in 1997, the estimated replacement yield being 287,000. For hooded seals the TAC in 1997 was set at 15,000 with a 10,000 "reserve", the replacement yield estimates being 24,000 to 34,000.

[3]DFO, Seal Report: Final Report 1996 (July 3, 1996)(preliminary figures)

[4]DFO, Newfoundland Region : The 1996 Seal Fishery Activity Report.

[5]DFO internal memorandum. We assume 48 working weeks per annum.

[6]Calculated from documents released by DFO under Access to Information legislation. Estimate is based on 6.5m pounds, a $0.20 subsidy by DFO and $0.15 subsidy by Newfoundland ($0.10 to processors and $0.05 to sealers).

[7]Sealing An Industry in Transition, October 1996, Report presented by the Seal Industry Advisory Council, (hereafter referred to as SIAC), a council formed at the initiative of the Canadian Sealers' Association.

[8]King (1981) reports that in 1980 longliner fishers received $1,637 for 13 days of effort, the equivalent of $3,215 in 1996. Labour received 70% of total boat revenue.

Table 1 summarizes our estimates of the performance of the industry's three sectors: sealing, seal processing and the transporting of seals and seal products.

	Sealers	Transport	Processor	Combined
Revenues	5.7	0.665	8.96	8.96
Payments to:				
Sealers	n/a	n/a	5.7	
Transport	0.396	n/a	0.296	
Other	1.414	0.057	1.179	2.650
Value-added*	3.917	0.608	1.785	6.31
Government expenditures				
Subsidies				1.723
Other				1.674
Adjusted value: Value-added less government expenditures				2.913
Value-added less government expenditures less organs				1.973
If true cost of labour and capital (opportunity cost) is 31% of Value-added: Net value is				0.000

* Value-added: Revenues less payments to other sectors (representing the contribution of labour and capital inside the sectors).

Table 1: 1996 Newfoundland seal hunt (in millions of 1996 dollars)

The three sectors combined produced output for which they received $8.96m.[9] Their combined purchases of goods and services from the rest of the economy was $2.65m to give a Value-added of $6.31m. This is then the earnings of labour and capital in all three activities. From Value-added we must subtract meat subsidies of $1.72m and also government expenditures directly related to the hunt of $1.67m[10] to give an Adjusted Value-added of $2.91m.

Was the hunt worth it? We think the answer is an emphatic no.

[9]SIAC is entirely incorrect in adding the earnings of the transport sector to that of processors since the latter already includes payments for transport.

[10]Figure from internal DFO memoranda obtained through Access to Information legislation.

Value-added

The Value-added of the industry to Newfoundland (including federal government subsidies of $1.3m) was $6.31m or 0.063% of Newfoundland's GDP.[11] What of job creation? Apart from payments to sealers, DFO estimates $1.0m was spent on labour in processing whereas SIAC claims $1.775m, including deductions at source. Estimates of how much employment was created in processing also differ, with DFO attributing 2,000 person/weeks and SIAC claiming 3,065 for plant workers and administration.[12] We estimate employment in commercial sealing and processing added the equivalent of about 100 - 120 jobs in a total work force of 190,000, that is about 0.06% of total Newfoundland employment. For Canada as a whole, the Value-added net of the costs to governments was only $2.9m.

"Value-added" is the earnings of labour and capital. To begin to obtain the real contribution to sealers and to society we must subtract "opportunity cost", that is the value workers place on their time and the depreciation, maintenance, interest and foregone investment opportunities for the owners of capital. A good measure of this is the absolute minimum sum workers and the owners of capital would have accepted to do the job. If we use plausible values for this, it is almost certain the net economic benefits to Canada are negative, and the net gains to Newfoundlanders grossly overstated.

In previous studies (see the report of the Royal Commission on Seals and Sealing for a survey of four studies), it is customary to argue that workers in the Newfoundland hunt incur no sacrifices in going hunting, thus the opportunity cost is zero, an assumption that is extremely rare in cost benefit studies. Put differently, it is customary to assume that commercial sealers and workers in seal processing and transport would be better off if they earned just ONE DOLLAR rather than not going sealing, and similarly that there is no depreciation for wear and tear on boats.[13] The problem is that it is not only foregone employment opportunities that count but also other activities such as leisure, home production, and education as well as increases in risk-taking by going sealing.

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[11] In 1996, GDP of Newfoundland was $10,068m, employment 190,000, unemployment rate 19.4%, participation rate 52.1% (compared to 64.9% for Canada as a whole), and average weakly earnings were $532. Source Canadian Economic Observer, June 1997, Statistical Summary.

[12] Sources are internal DFO memoranda obtained through Access to Information legislation and SIAC, Sealing Industry in Transition. Some questions must arise as to how many additional people were employed during the sealing season versus how many would be employed regardless (management, maintenance, watchmen etc.) We use a compromise figure of 4,500.

[13] See The Royal Commission on Seals and Sealing in Canada, 1982, volume II, page 348 for discussion.) The Commission acknowledges that assuming a zero opportunity cost is most unusual. The justification for doing so is the high unemployment rate among fishers at the time of the hunt, when general unemployment rates in sealing communities might be as high as 50%, and that the foregone output from sealing is plausibly zero. Note that historically, fishers were perhaps 70% of all sealers (landsmen, longliners and large vessel crew) but constituted nearly all of the longliner crew. (see King 1981; and Royal Commission Table 14.5). When interviewed, sealers all indicated that they would not have been willing to give up jobs to go sealing, implying that no such sacrifice was needed.

But no one asks the simple question, "If boats and men are so freely available, weekly earnings for sealers well above average, there is no opportunity cost, and entry is so easy, why do not more people go sealing for commercial purposes?" It is not because of lack of men available, since only 7% of licensed commercial sealers seriously participated in the hunt on a commercial basis, not to mention those who were available but chose not to buy a licence.[14] In 1996 there were perhaps 16,000 idle fishers: according to government estimates, perhaps 600 sealed for commercial purposes,[15] and they accounted for most of the catch. What prevented them from participating fully when they can add to their income at no personal sacrifice? Why are sealers on longliners able to command weekly earnings of in excess of $1,300 when there are so many others who would be happy to do the job for much less? Nor are these earnings unusual. Such earnings are typical in the industry.[16] Nor is the number of vessels an obvious constraint, when many licensed vessels are not active, and the number of active vessels varies considerably.[17]

Of all industries, fisheries with easy access and an informal earnings structure should be peculiarly suited to absorbing idle inputs, and indeed, are frequently touted as the "employer of last resort". If labour and capital inputs have no opportunity cost then we would expect them to participate as long as revenues are sufficient to cover all but the out-of-pocket expenses (fuel, ammunition, food), and one would expect to see net earnings in some years close to zero. But we see nothing like that. Is it not more likely that an arduous job in such harsh weather conditions simply requires compensation for people to give up the comfort and safety of their homes, where they are not necessarily idle though officially unemployed? Is it not the case that boat-owners need the promise of substantial earnings to place their vessels at risk?

Data for the 1971 to 1984 period strongly suggest that the costs to sealers are largely real and substantial and that commercial sealers, other than landsmen perhaps, need to receive payments of this order to induce them to participate. The data also suggest that commercial sealers earn relatively little surplus. It is certainly not the case that all their earnings are surplus. Compared

[14]If the situation has not changed dramatically since the time of the Royal Commission, it is likely the case that perhaps half of the licensed individuals actually participated in the hunt, but only a very small number did so on a significant scale commercially.

[15] DFO Newfoundland Region 1996 Seal Fishery: Related issues and considerations

[16]The Royal Commission chose 1982 as a typical year in sealing. In that year, 9,332 sealers were licensed in Newfoundland, of which 5,703 participated. Of these, 87% of them were landsmen of whom perhaps 40% recorded no catch. Landsmen earned between $150 and $750 per season in today's terms.(see King page 56 for the very skewed earnings of landsmen in Newfoundland.) One is left with the distinct impression that though licensed as commercial hunters, most of the participants are closer to what we might think of as sport-hunters. Our concern here is not, however, with landsmen but with those who use the larger vessels and account for most of the catch. Longliners earned between $2250 and $2,700 on average, with highliners earning between $4,500 and $4,800 per season (see Royal Commission Table 14.3). Earnings have been adjusted upwards by 150% to allow for inflation.

[17] In 1982 there were 235 licensed vessels in the sealing fleet of which only 124 were active. Between 1973 and 1982 the number of craft engaged varied significantly. Among longliners, there were 184 vessels participating in 1976 but only 104 the next year (see Royal Commission Table 14.4). Even in locations where access to vessels capable of finding the seals is a constraint, one needs to explain why labour commands such a large amount of income.

to this period, the price for seals received in 1996 is already very low. Furthermore, we have government reports[18] that commercial operations would find it very difficult but for subsidies. All this strongly suggests that surpluses are simply not there and without such surpluses we must infer opportunity costs are close to observed costs. (see Appendix B for further analysis.)

If we assume that fishers and vessel owners would refuse to participate if they could not earn at least 46% of what they did in 1996, then there would be no gain to Canada from operating the sealing industry. [19]

Seal Penises

The economic viability of the industry is heavily dependent on meat subsidies and the sale of penises. Between them, these constitute 55% of the revenue of sealers and boat owners after paying for fuel, ammunition etc. For an old harp, the penis and the meat subsidy is fully 75% of the landed value (See Table 2 below).

	Pelt	Fat	Meat	Flippers	Organ *	Total
Old harps	10.00	4.27	17.00	0	26.00	57.27
Beater (25+ days)	16.00	1.19	2.60	4.00	0	23.79
Bedlamer (13-14+ months)	10.00	2.52	9.60	4.00	0	26.12

* males only

Table 2: Canadian Atlantic Seal Product Landed Values ($ Per Seal)

Note: The following assumptions are made in determining the above calculations.

1) Old harps: recoverable seal meat 85 pounds, recoverable seal blubber 135 pounds.
2) Bedlamer: recoverable seal meat 48 pounds, recoverable seal blubber 80 pounds.
3) Beater: recoverable seal meat 13 pounds, recoverable seal blubber 38 pounds.
   Prices are as follows: blubber 0.7 cents per kilogram, seal meat 0.20 cents per pound, flippers $2.00 each
   All prices are landed values, not processed values. (Source: Internal DFO memorandum)

In a public opinion survey, Kellert (1991) found that 69.5% of Canadians strongly or moderately felt it was wrong to kill seals for luxury products like seals. In an even more recent Angus Reid Group/International Fund for Animal Welfare poll, 82% of Canadians surveyed were less likely to support the commercial seal hunt when informed of the growing trade in seal penises for the aphrodisiac market. Since the killing of a harp seal simply for its penis is profitable, whereas transporting the carcasses back and processing them is not (hence the need for the substantial

[18] DFO Newfoundland Region 1996 Seal Fishery: Related issues and considerations

[19] Since the value of goods produced net of purchases of inputs from other sectors and net of government outlays was $2.9m, (see Table 1: $2.9m is 46% of the $6.31m Value-added which is paid to labour and capital), if opportunity costs were in excess of $2.9m/$6.31m = 46% of Value-added then there would be no net gain.

meat subsidy) we can infer that the primary reason for killing mature males is to collect their penises. [20] But the Value-added of $2.9m used above, attributes positive social value to penises of $0.94m whereas we have strong evidence that society as a whole finds the social value to be negative. Even if we simply discount penis consumption to having a zero value, Value-added is only $1.97m. Now the opportunity cost of labour and capital would have to be only 31% of their earnings for the activity to have zero social net worth.

The above estimates assume about 31,000 penises were sold, but this may well understate the actual take as government reports acknowledge there is a "substantial" black market[21]. The Director General, Resource Management of DFO indicated that as many as 50,000 penises might have been taken and "inventoried". [22] We simply do not know how many seals are being slaughtered just for penises and not being reported?

Subsidies

Meat subsidies were substantial, being as high as 400% of the price of the processed output.[23] In 1996, processors claimed 6.5m pounds of meat were processed, an estimated 63% of the entire catch (assuming 41 pounds per kill). With a 750% increase in meat sales by volume over 1995, where did the market come from?[24] It would have been much more profitable for all concerned to simply claim the subsidy and dump the carcasses. [25] Certainly the large subsidies cannot be justified in economic terms simply to process the meat. Since we know seals were being killed in large numbers for penises without the subsidy and the meat was largely not being landed, it can be argued that the policy of "full utilization" is simply serving to mask and expedite the killing of seals for penises.

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[20] To the extent that it is difficult to distinguish male from female harp seals at a distance, females are also liable to be shot, so that deaths due to the penis hunting may exceed the number of penises landed by a large margin.

[21] DFO Newfoundland Region 1996 Seal Fishery: Related issues and considerations

[22] Ottawa Citizen, June 26th, 1997. Note that it is not illegal to kill seals only for their penises, though such kills should, in principle, be reported.

[23] In 1995 some 820,000 pounds of meat were processed in Newfoundland (the processor targeted for 1 million pounds) with all but 40,000 going into foxfeed. This represented about 39% of the maximum potential, assuming an average of 41 lbs of meat per landed seal.

[24] SIAC (page 29) explicitly claims more than 227,000 seal skins and 6.5m pounds of seal meat were purchased (averaging 28.6 pounds per pelt purchased). The subsidy received by sealers was 20 cents per pound or $1.3m from the federal government but only $325,000 or 5 cents a pound from Newfoundland. Newfoundland subsidies were apparently capped at $450,000 so the implication is that processors received only 1.92 cents per pound in subsidies.

[25] The opportunity and incentive for abuse is likely to be very large, and should be a major concern. However, it should be said that we have no evidence that this happened.

Illegal Harvest

About 26,000 pups were allegedly harvested illegally (and were seized, the matter being before the courts at this time) and the processors participated by buying the kill - nearly one in every 10 kills[26] Such negative activities, if widely publicized, would cause considerable concern to Canadians, whether or not they prove to be strictly illegal. This, and the widespread distaste for the activity in general should be factored in as a cost in a full evaluation. We have not attempted to do so here. Previous studies that do so find the social value of the industry to be hugely negative.

Concluding comments

In keeping with the Royal Commission on Seals and Sealing and the consensus among cost-benefit analysts, we have not used the "multipliers" which permit industry figures to be inflated and which, presumably, are the basis for claims that the industry might have generated benefits of more than $15 million. We have instead used the now widely accepted procedure of "shadow pricing" inputs to allow for unemployment. A major departure from the Royal Commission and other studies is not to assume either a zero opportunity cost of labour and capital (which is patently absurd) or, at the other extreme, assume that sealers would only have unemployment rates equal to the provincial average. We have instead calculated the minimum percentage of what people actually earned that was needed to persuade them to participate.

We have deviated marginally from standard practice in making the *ad hoc* assumption that, though some persons were willing to pay more than $1 million for seal penises, we should discount this on the grounds that many others would find the whole process of killing seals for their penises, and marketing them and consuming them, very disagreeable. This surely understates the "negative externality" but goes some distance in the right direction.

We have not, nor have other studies, adequately considered the fact that this, being a common-property resource with very easy access, is very unlikely to generate much of a surplus especially among commercial sealers. This is elaborated on in Appendix B.

A summary of our findings prefaced this paper and we will not repeat them here, other than to say that the evidence strongly suggests that even by very narrowly defined criteria that a professional economist would use, the hunt is of small benefit to Newfoundland and is very likely a net cost to Canada. Given this and the fact that the activity is so abhorrent to many, in Canada and elsewhere, it is difficult to see why public funds are being used to sustain this activity.

[26]The fact that this killing has occurred, shows that control is not effective. Given the very marginal viability of the hunt, we can anticipate a constant infringement in this regard.

Appendix A

Estimates of sealer receipts

Estimates of total receipts of sealers vary with values plausibly ranging from a low of $5.008m to a high of $6.5m. The difference is largely due to the suspected under-reporting of the sale of penises which are typically sold in the black market, and the ambiguity as to who collects the revenue. The 1996 Seal Report (preliminary) only acknowledges 2,559 penises being sold for $48,980, that is at $19.20 per penis. The Director General, Resource Management of DFO stated (Ottawa Citizen, June 26, 1997) that as many as 50,000 penises were collected, which if sold, would put a value of sales to sealers of $875 thousand at $17.50 per penis. It is unclear whether or not the informal penis sales are made directly to sealers or are collected by the processors, and whether the processors have paid all or part of the funds over to the sealers and included these in the estimates of sealer receipts. The 1996 Seal Fishing Activity Report puts a value of $470,000 to "seal organs" at a low price of $15.20, implying some 30,920 were sold. Note that the value of sales by processors is estimated by DFO at $0.940m which suggests a price of around $30 per processed penis.

Another source of ambiguity, though not as problematic, arises as to the treatment of alleged illegal sales of whitecoats and bluebacks to processors, which were valued at $373 thousand. Using the 1996 Seal Report (preliminary) figure of $5.008m and assuming this was net of illegal sales (see text) and that all unreported penis sales go to the processing sector, we get a low estimate of $5.02m (difference is due to rounding). If we assume that SIAC reports correctly, and have excluded illegal sales, as they should be, and that the sale of all unreported penises go to sealers, we get $5.697m + $0.810m = $6.507m.

We can treat DFO and SIAC estimates of sales as two alternative unexplained values. From both can be subtracted illegal sales to get two figures for sealer revenues. This implicitly assumes all unreported penis sales go to processing, which seems implausible. This does not affect an assessment of both sectors combined but does affect the assessment of how sealers and processors fare. According to documents obtained through Access to Information legislation, DFO has receipts from buyers of $5.386m. Since the 1996 Seal Report (preliminary) placed a landed value of $5.008m, exactly $373 thousand less than the Landed Value figure of $5.386, we can infer that the DFO estimated Landed Value of $5.386m included illegal sales.

We have elected to go with the single DFO estimates, which assume only 30,920 penises, implying that half of the final values goes to sealers and half to processors, and that excludes allegedly illegal sales.

Appendix B

On the supply response of commercial sealers and the likelihood of surpluses

What is at issue here is the extent to which factors employed in the industry earn more than their opportunity cost which is defined as the minimum needed to induce the labour and capital to enter into the industry, as sealers, providers of transport or processors. One way of inferring this is to statistically estimate the supply function, that is the relationship between the prices received and the quantity supplied. In a situation where there are many producers the supply function would show the marginal cost of supplying the quantities. Thus those sealers who have easiest access to seals and are least demanding in what they must get paid to participate would appear at the beginning of the supply curve, and then we add the sealers in terms of those with increasing difficulty of access and/or increasing opportunity costs. Opportunity costs could well be foregone leisure, comfort and safety and not only employment opportunities. Such a curve is shown by MC in Figure 1. If the price offered was P_{96} then the quantity landed would be Q_{96} and the producer surplus or net benefit would be the difference between price and marginal cost, namely area P_{96}AB. How big this area is depends on the shape of the marginal cost curve. The assumption of zero opportunity cost over and above purchased inputs makes the curve virtually right angled, that is flat from B up to catches of Q_{96} and then vertical. So we look to the data to see the shape of the supply curve.

But note that a steep curve is not itself evidence of a large surplus in this case because there is free access to sealing, the classical common property situation. The MC supply curve will understate the costs to the industry (because sealers ignore the impact their catch has on the chances of other sealers catching seals) and the true (social) cost would be higher. If then in Figure 1 true costs were given by the curve MSC then social net benefits would be only area P_{96}CB MINUS area CDA. And from this we would basically have to subtract the subsidies etc. In this appendix we take a preliminary look at the data to see what it suggests about the shape of the supply curve and hence the possible surpluses.

Data from the Royal Commission are revealing. Figure 2 shows that the total seals landed varies considerably as does that of the longliners (the bottom series). We infer the supply curve is unlikely to be very steep, but we need to also know what has happened to prices. The upper series in Figure 3 shows how the real price of seals, in constant 1986 dollars, varied with seal prices adjusted for changes in the Consumer Price Index (from Table 12, Canadian Economic Observer, Historical Statistics Supplement 1994/1995 , hereafter referred to as CEO. Note that real prices are high even in 1986 dollars, and well in excess of the approximately $23 (in 1996 values) received by sealers in 1996. (price per kill in 1996 dollars with 50% inflation since then amounts to between $15.18.) We do note considerable increase in trend prices from 1971 to 1980 and this is associated with increases in output as seen in Figure 2, which is suggestive of significant steepness in the supply curve and hence considerable surpluses.

It needs to be said that we have not estimated the supply function in a proper statistical manner, allowing for the impact of weather, seal stocks, demand shifts etc. This is a formidable task, and

with such limited time series, of questionable use. Nevertheless we offer the following Figures in the belief that they are not at all consistent with the steeply rising supply functions that large surpluses would suggest.

Figure 4 shows industry landings as a function of landed prices expressed in real 1986 dollars. A significant surplus may well exist. However, the supply function we are looking for assumes there are no time trends in the price or opportunity costs of inputs. It is, in effect, a supply curve for any one year and we only have time series data. We believe that much of the rise in price over the years is not due to the fact that outputs also increased over most of this period, but rather is due to the rapidly rising cost of labour throughout Canada over this time period. Labour is a dominant component of sealing costs. To allow for this we divide (1986) prices by the hourly wage in employment. (Source of hourly earnings are CEO, Table 16 for 1976 onwards. Data for earlier periods are constructed assuming hourly earnings varied at the same rate as Total Labour Income, in Table 9, CEO). The cost-adjusted prices (multiplied by 10 to get a scale comparable to prices) are shown by the lower series in Figure 3, and we observe that, relative to the cost of labour, the price received per seal varied but showed little tendency to rise systematically over time. Put differently, the rising trend prices seen in the industry data can be explained by the fact that supply curves drift upwards as labour costs rise, rather than a movement along the supply curve.

The very short season and the fact that boats must be prepared in advance, suggests that many sealers decide to land their catch based on the prices in the recent past. Figure 5 shows landings in relation to last year's price divided by hourly wages in paid employment. Here, we see very little evidence of an upward slope, particularly if one deletes the 1983/84 observation, as at this time the industry is in a state of chaos. In 1983 and 1984, following the European ban on whitecoat and blueback pelt imports, prices and quantities landed fell precipitously, but so did the activities of the strictly commercial fishing industry. Note that in 1982 the catch was 122,024 of which 18% comes from landsmen, 20% from longliners and 58% by large vessels. By 1984, large vessels no longer participate in the catch for commercial purposes, while landsmen account for fully 83%. Longliners catch only 13% of their 1982 landings. To the extent that landsmen are not primarily motivated by money, there is little "commercial" sealing left.

Our interest is primarily in the longliners. Figure 6 shows much the same results for longliners. Cost-adjusted prices vary little, except for the collapsing industry in 1983/84. This suggests that supply functions are fairly flat and thus there are little surpluses.[27]

We reiterate here that even if we had found a significant slope, the common-property feature would have caused us to discount the surplus. By how much? We are unable to say.[28]

[27] Of course we need to separate out the role of demand, the impact of weather, seals stocks etc. and given the few observations available this may prove impossible.

[28] I would like to acknowledge the considerable help of David Lavigne and Patricia Embleton in the preparation of this

Figure 1: The nature of net benefits in sealing

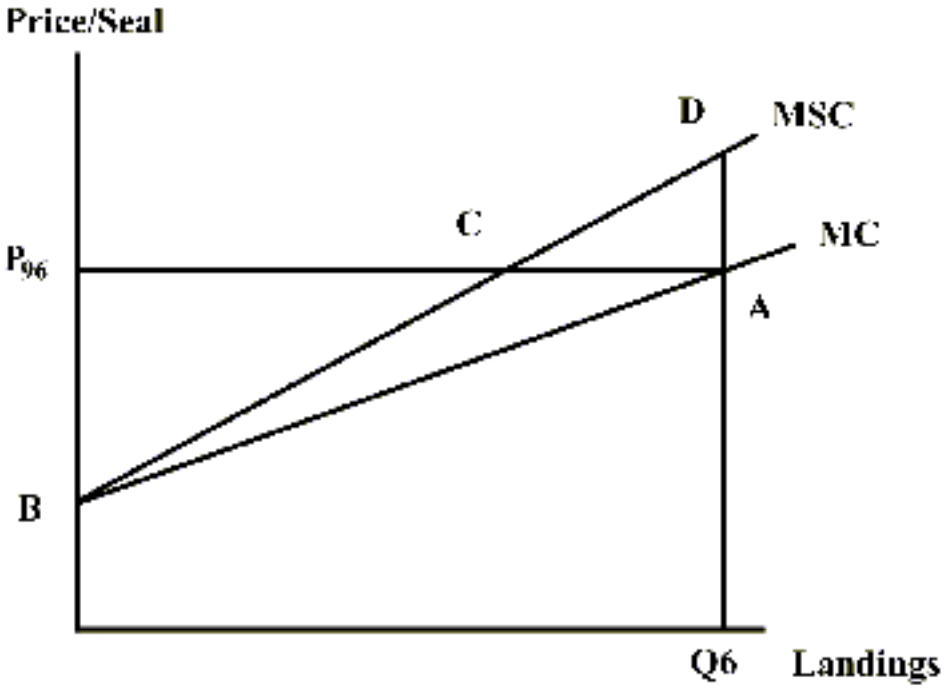

Figure 2: Industry and longliner landings

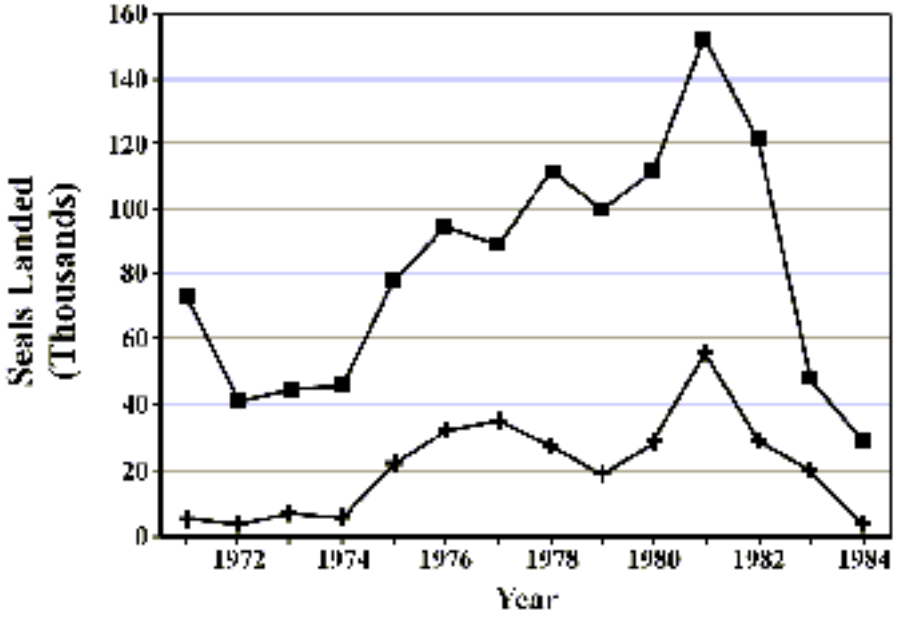

Figure 3: Real value (upper) and real value relative to labour costs (lower)

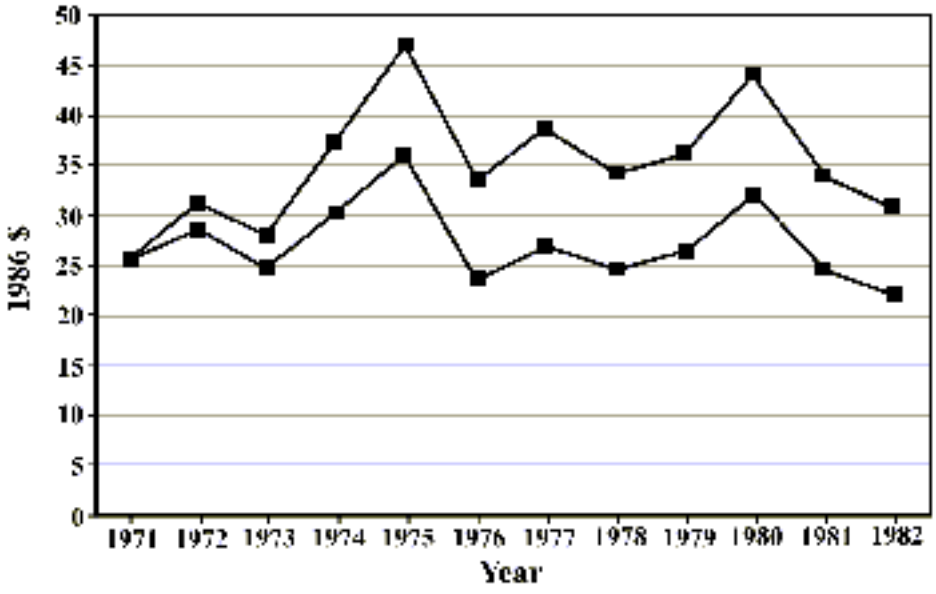

Figure 4: Industry landings in relation to price in previous year.

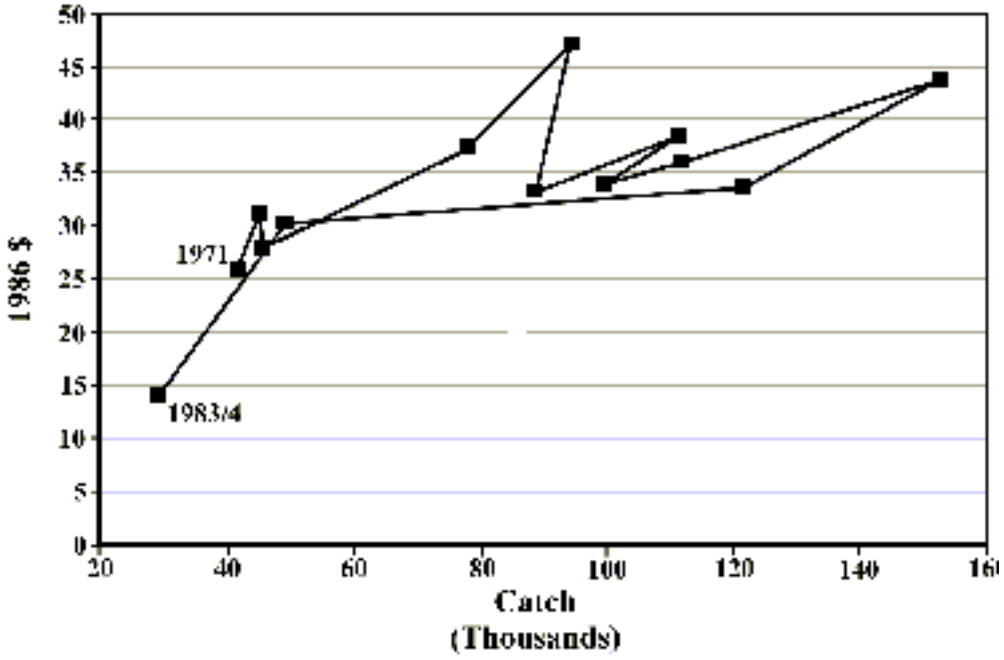

Figure 5: Industry landings and cost-adjusted price in previous year.

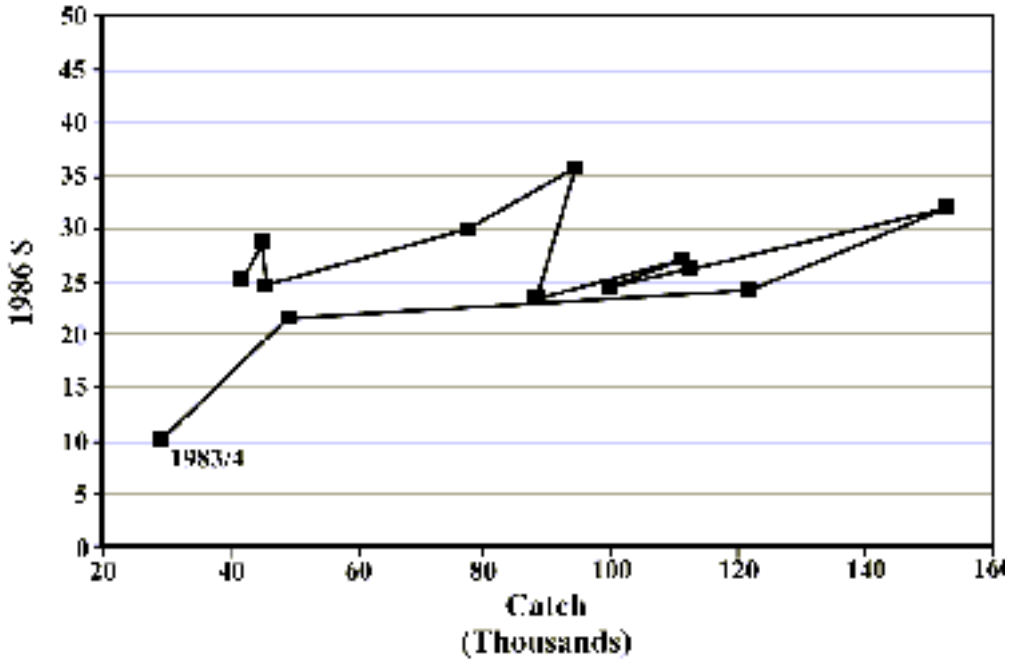

Figure 6: Longliner landings in relation to cost-adjusted price in previous year.