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RENT CAPTURE IN THE NAMIBIAN FISHERIES: *The Case of Hake*

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ABSTRACT

This paper examines the subject of rent capture in the Namibian fisheries and the impact of this incidence on industry returns. The evidence considered for this enquiry is the Annual Income and Expenditure Survey (AIES) for 2002. The fishery chosen for the study is the demersal hake fishery. Various methods of rent capture in rights-based fisheries are considered and the *ad valorem* royalty charge used in the Namibian fisheries is discussed in detail. An estimate of the resource rent is obtained after account of fishing costs and revenues is taken. It is found that industry net returns turn negative after rent capture by quota fees, but improvements in the catching accounts data is nevertheless necessary in order to arrive at a better estimate of the resource rent in the fishery.

Keywords *Rents, Rent-capture, Quota fee, Rights-based, Net-returns, Hake fishery, Management, Namibia.*

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1 INTRODUCTION

Rights-based fisheries management has been introduced in the Namibian fisheries to improve the economic performance of the fisheries. The aim is to address the common property problem of fisheries by the creation of private property rights and increase the flow of net economic gains from the resource. Do Namibian fisheries, twelve years after the radical reorganisation, generate positive net economic rents? Rent capture by quota fees presupposes the existence of rents in the fisheries. The government, as a custodian of the resources may capture some, or even all, rents generated in the fisheries, but not more than the rent size. If fishery managers prefer to collect rents generated from the fisheries, it is important that they have an idea of the costs of fishing and the rent size in the fisheries.

While the common property nature of fisheries resources provides ground for rent extraction, there is no doubt that the size of the resource rent sets limits to how much could be raised for public revenue. There is little or no ground to raise public revenue by charging more than what the fisheries can generate. In other words, rent capture should not bite into the normal profits of fishermen. To the extent that this occurs, the fishermen's ability to meet operational costs and invest in conservation and cost-reducing technology is greatly reduced. This paper examines the subject of rent capture in the Namibian fisheries, based on cost and earnings information from the industry. The fishery chosen for the study is the demersal hake fishery. The hake fishery accounts for more than half of the final value of all fishery products in Namibia and no less than 70% of state revenue in quota fees (MFMR 2002).The question to be raised is whether, on balance, the Namibian hake fishery faces positive economic rents and to what extent rent capture affects individual hake companies.

The paper is organised as follows. Background information on the Namibian hake fishery management regime is laid out in chapter 2. Chapter 3 expands on chapter 2 and discusses the hake quota management in more detail. Chapter 4 considers the theory of rent capture in quota-managed fisheries, while chapter 5 looks at practical advances in resource rent extraction in the Namibian hake fishery. The data and the main results are discussed in chapter 6. The final chapter summarises the main findings and draws out some of their policy implications.

2 BACKGROUND

2.1 Description of the fishery

The demersal hake fishery is, by far, the most commercially important fishery in Namibia, contributing more than one-half of the final value of all fish products (MFMR 2002). However, the 154,600 tons landed in 2002 are no more than 25% of the total catch from all fisheries. The hake fishery centres on the two hake species, *Merluccius capensis* and *Merluccius paradoxus.* Nearly all fishing occurs in the shelf area, which is about 110 000 km^2 inside the 200 metre depth contour from the shore and approximately 230 000 km^2 inside the 1000 depth contour (MFMR 1991).

A trawl fishery for hake has operated since the late 1950s or early 1960s in Namibian waters, mainly by long-range freezer trawlers of distant water fishing nations. No domestic fishery existed at that time. Prior to independence in March 1990, the hake stock was, like all other commercially exploited stocks in the Namibian waters, heavily overexploited (MFMR 1991). The management of the offshore resources in the sea off Namibia was under the purview of the International Commission for the Southeast Atlantic Fisheries (ICSEAF) until Namibia gained independence in 1990. A 200-mile Exclusive Economic Zone (EEZ) was only established immediately after independence.

The virtual open-access situation until 1990, coupled with the productive waters off Namibia due to the nutrient-rich Benguella upwelling current, attracted many distant water fishing fleets. In the late 1980s, the majority of foreign vessels fishing off Namibia were large (>1000 tons), long-range freezer trawlers, many equipped with on-board processing factories (MFMR 1991). Hake catches rose and peaked in 1972 (Figure 1), indicating a possible influx of more vessels. However, catches declined erratically thereafter due to, most likely, increased fishing mortality. This is a classical textbook example of more vessels chasing fewer fish and points to the need for management measures in the direction of more conservation and effort reduction.

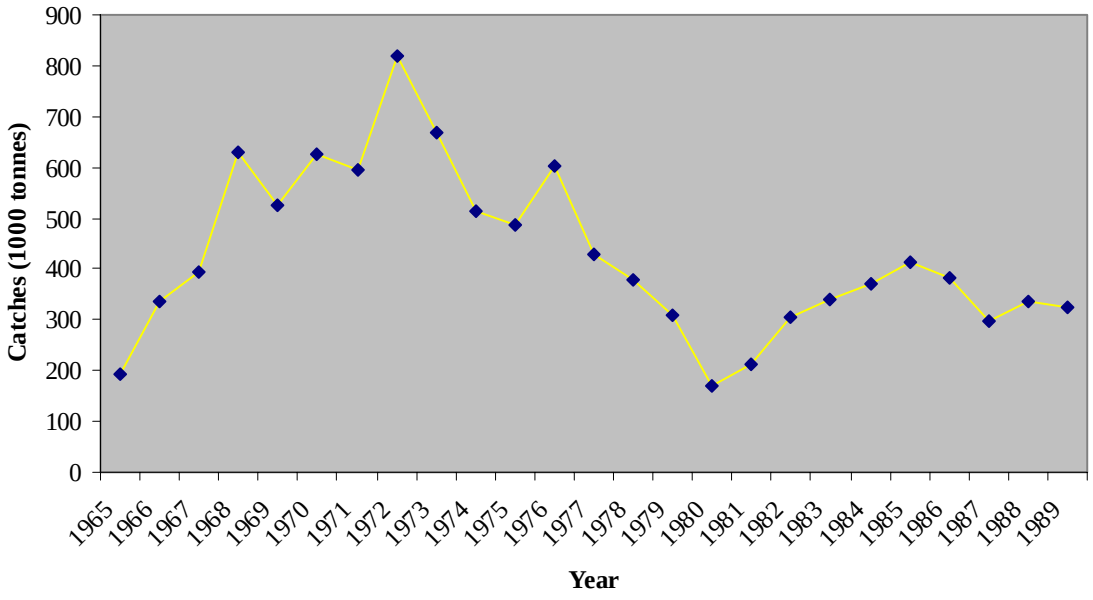


Figure 1: Demersal hake catches in the waters off Namibia, 1965 – 1989 (MFMR 1991)

The virtual open access, pre-independence regime called for the design and implementation of a fisheries management regime to rebuild the depleted stocks and ensure long-term gains. Immediately after independence in 1990, Namibia declared a 200-mile EEZ in accordance with the United Nations Law of the Sea of 1982. Significant advances have taken place since then and, to date, only Namibian-licensed trawl and longline fleets target the fishery under an individual quota (IQ) property rights regime.

2.2 The hake fishery management regime

The management of the hake fishery, like all commercial fisheries in Namibia, consists of a combination of harvesting rights, total allowable catches (TACs), individual quotas (IQs), a system of fees and a monitoring control and surveillance (MCS) system. The surveillance and enforcement system administer fines, but recourse to courts is also sought. Renewable harvesting rights form the core of the Namibian fisheries management system. Fishing rights are issued to successful bidders for a period of seven, ten, fifteen or twenty years on account of various factors such as the level of Namibian ownership, investment in vessels and onshore facilities, fishing experience and social investment. Prior to 1 August 2001, harvesting rights were issued for 4, 7 and 10 years. The granting of harvesting rights limits access to the fishery.

The setting of the TAC corresponds to the best biological information available and is intended to allow for optimal utilisation of the resources. Individual Quotas are issued to right holders and can be caught by the use of any vessel licensed to fish in Namibian waters. In Namibian fisheries, quotas are not permanently transferable, but they can be

leased within a fishing season. In the event of a lease, the original right holder is responsible for use of the quota and the payment of fees (MFMR 2000).

The reorganisation of the Namibian fisheries under the property rights management system has yielded numerous beneficial outcomes. The hake fishery is a prime example of this practical advance during the last 12 years. A predominantly domestic fleet has been realised as discussed in chapter 5 and, unlike during the pre-independence era, increasingly more Namibians participate in the fishery. This result comes about because of the Namibianisation policy, which calls for increasing participation of Namibians in the fishing industry. Stock rebuilding remains a key management objective, and the TAC increased gradually over the 13-year period, from 60,000 tons to 195,000 tons as shown in Table 1. Nevertheless, the management of the Namibian fisheries admits the vagaries of the marine environment, in particular the Benguela Niño event, which seems to occur once a decade and manifested in the general warming of sea surface temperatures and restrained upwelling along the Namibian coast (Gammelsrød and Kvaleberg 1998).

Table 1**: Demersal hake TAC and catch (in 1000 tons), 1990 –2002/3**

Year	TAC	Catch
1990	60	58
1991	60	56
1992	90	88
1993	120	108
1994	150	112
1995	150	130
1996	170	129
1997	120	118
1998	165	151
1999/00*	210	167
2000/01	194	167
2001/02	200	173
2002/03	195	171

* The Hake fishing season was changed from the calendar year at the end of 1999 to May/April season. As a consequence, an interim TAC of 65 000 mt was allocated for the January -April 1999 period, and a corresponding 74,761 mt was caught. This was followed by the reported TAC of 210 000 mt for the 1999/2000 season.

3 THE HAKE QUOTA SYSTEM

3.1 Quota allocation criteria

The TAC for hake is allocated to hake right holders only, with a special provision for tuna right holders. In fact, according to the White Paper (MFMR 1991) a right holder is granted a harvesting right for only one species. This arrangement seeks to keep the catching capacity of the industry in line with the resource level for each fishery. The proportion of a TAC due to each right holder depends on performance conditions such as the level of investment, employment and socio-economic contribution. A defining characteristic of the hake TAC allocation in Namibia is that about 60% of the TAC is allocated to wet fish operations and about 40% to sea-frozen operations. This proportion is spread among the right holders, albeit unevenly, depending on their relative catching capacity. This is an employment-friendly policy instrument, which serves to promote and retain employment onshore. In addition, wet fish landings are encouraged by a favourable quota fee charge.

3.2 Fees and levies

The imposition of various fees in the Namibian fisheries goes beyond the cost-recovery objective. Fisheries management is not costless. The existence of fisheries management costs raises the question of who should finance these costs and why. Often, governments, the conventional provider and payee of fisheries management services, seek to recover fisheries management costs from the fishing industry. A common argument for cost recovery is that the industry is the main beneficiary of fisheries management and, hence, should pay for it (Shranck *et al* 2003). Cost-recovery therefore enhances efficiency in the use of economic resources as it provides the link between the provision and the use of fisheries management services. At most, five different categories of fees are levied from fishers in Namibia. Each fee category is designed for a specific objective such as the management of by-catch, distributional and cost of management objectives and the transformation of the industry, including the Namibianisation policy (Table 2).

Table 2: Types of fees in Namibian fisheries (Anon 2001. Fishing Industry Handbook: Mozambique, Namibia and South Africa)

Category	Payee	Purpose
Licence fees	All active fishing vessel operators	Accrues to government as cost-recovery.
Observer fees	All active fishing vessel operators	Accrues to Fisheries Observer Agency for funding MCS.
By-catch fees	Quota/licence holders	Accrues to government and serves as a deterrent against deliberate targeting of non-target species.
Marine Resources Fund Levies	Quota/licence holders	Accrues to MFMR for funding research and human resource development.
Quota fees	Quota holders	Accrues to government for fiscal allocation to other economy-wide uses such as employment and Namibianisation..

The transformation and distributional objectives are advanced through a quota fee. First and foremost, the quota fee is structured to promote the development of a domestic fleet by charging differential rates. For example, hake quota holders using Namibian-based vessels carrying at least 80% Namibian crew pay a more favourable fee than those using crews with fewer Namibians. It should be observed that this percentage has, since 2002, been increased to 85% for furtherance of the Namibianisation policy. To promote local employment, fish landed for onshore processing attracts lower quota fees than fish processed at sea, irrespective of the vessel used. The reader is alerted that the quota fee charge amounts to rent capture which accrues to government for fiscal allocation to other alternative uses in the economy. The extent to which this charge bites into rents generated from the fishery is the subject of empirical investigation in this paper.

4 THE THEORY OF RENT CAPTURE IN FISHERIES

4.1 Economic rent generation in fisheries

The notion of economic rent in fisheries is embedded in the traditional bioeconomic fishery models. The fish stock as a natural resource is productive and thus earns a return. This return or resource rent is most commonly realised in well-managed fisheries (Neher 1990). The rent accruing directly from the fishery may be accounted for as the difference between revenues from, and costs due to fishing (Hartwick and Olewiler 1998, Charles 2001). It is a positive net cash flow after all costs of fishing have been paid to compensate for the effort harnessed to harvesting the resource and represents a measure of economic returns that the owner of the resource could obtain, if the owner were to exploit the resource. It is standard practice to conceive of total revenue in fisheries (TR) as yield (Y) multiplied by the price of fish (p), i.e., TR = pY, for some constant p. In a sustainable fishery context, the TR curve corresponds to the sustainable yield curve, first increasing and then falling as effort expands. The compensation made to the effort expended is at some unit cost ($\hat{w}$) which represents the opportunities that these cooperating factors have in the rest of the economy. In this broad setting, the costs of fishing include the actual costs of fishing inputs as well as the opportunity costs - the value of benefits foregone by harnessing resources to fishing. It is important to note that the inclusion of opportunity costs in the cost function distinguishes this cost conceptualisation from the standard, financial cost. In effect, the normal or 'reasonable' profits become subsumed in the cost function. Thus, the total cost (TC) of fishing is the compensation to factors harnessed to fishing ($\hat{w}$) multiplied by effort (E), i.e., TC = $\hat{w}$E. The total cost increases with increasing effort. This relationship between TR and TC is captured by the standard Gordon-Schaefer diagram in Figure 2.

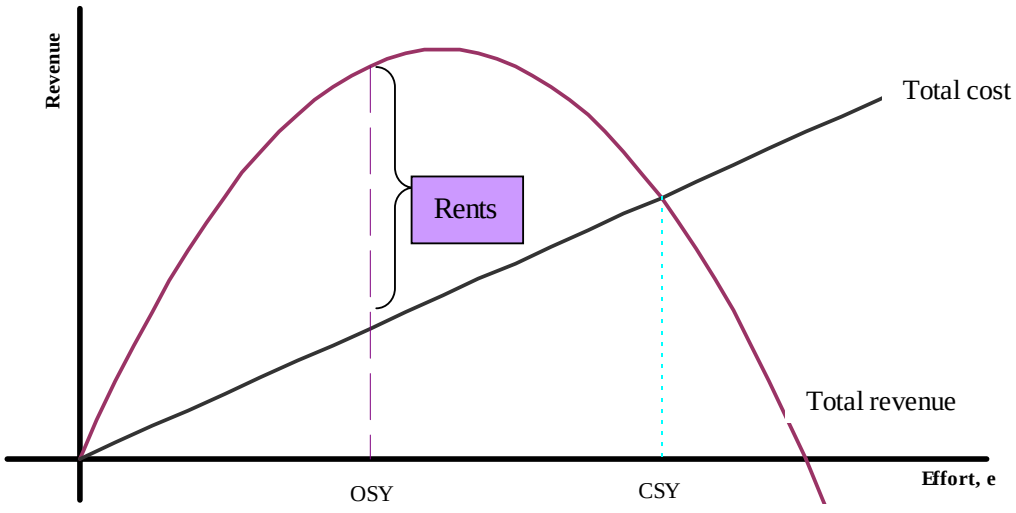


Figure 2**: Sustainable fisheries model (Hanneson 1993)**

A key feature of Figure 2 regards the difference between TR and TC, which gives a measure of economic rents. Recalling that TC already includes normal profits, economic rents exist as long as TR > TC. Along the cost curve, fishers earn normal profits equivalent to those earned elsewhere in the economy. However, with an efficient fisheries management regime, rents can be maximised at the optimal sustainable yield (OSY), corresponding to the optimal effort and yield levels. In the absence of rent capture by government for society-wide benefits, fishers receive and may keep these above-normal amounts, in addition to the normal profits. In the polar case of free and open access to the resource, rents are dissipated as effort expansion in search of perceived rents continues up to a point where the return from fishing just equals the cost, corresponding to the common property sustainable yield (CSY). Suppose the government, as a steward of the resource, is interested in capturing rents from the fisheries. Presumably, rent capture should not bite into the normal profits of the fishing enterprises. The extent to which excessive rent capture might occur largely depends on the magnitude of the resource rent in the fishery and the method of rent capture.

4.2 Rent capture in fisheries

The subject of rent capture in fisheries is closely related to the question of who owns the fish stocks and who should be entitled to the rent the resources can generate. The implementation of the extended fisheries jurisdiction emanating from the United Nations Law of the Sea bestows a form of ownership of the fisheries resources occurring in the 200-mile Exclusive Economic Zone to the coastal state. It was noted previously that fish stocks are economically productive and that the rent generated in the fisheries are a measure of the return to the owner of the resource, if the owner were to harvest the resource. The government, as the steward of the fishery resources, grants private property rights to the resource. In this case, the goverment overcomes the common property problem and public failure by renting out public rights to the resource. It is well established that the institution of private property rights in fisheries results in improved economic efficiency of the fisheries (Arnason 1991, Hanneson 1993, Grafton 1995). Of particular interest is how the surplus generated spills back to the owner of the resource and thus make private property rights compatible with public ownership of the resources. For this purpose, the government, as a custodian of the resource, may capture some, or even all of the rents.

4.3 Methods of rent capture

There are a number of alternative methods to capture rents from fisheries. Grafton (1995) specifies four such methods, namely (i) quota rental fee, (ii) profit charge, (iii) lump sum charge and (vi) an *ad valorem* (royalty) charge. Each method has different implications in respect of the distribution of profits among heterogeneous fishers, the ability to monitor and enforce rent capture and the flexibility to vary with changes in the value of the rent.

i. Quota rental fee

A quota rental charge is a natural method of capturing rent from a quota-managed fishery. The rent (R) captured from fisher *i* at time *t* is determined as a proportion of a quota price

multiplied by the quota holdings of the fisher at a competitive market rate of interest *r*, i.e.

$$R_{it} = \alpha \Gamma_t r q_{it},$$

where α is the quota charge rate, Γ_t is the market price of a quota at time *t*, *r* is the competitive rate of interest, and q_{it} is the number of quota units held by fisher *i* at time *t*.

A particular problem in relying on this rent capture tool regards obtaining a quota price that faithfully reflects the expected resource rent in the fishery. Lindner *et al.* (1992) observe that the quota price is only a correct measure of resource rent if the quota market is in equilibrium. Thus, choosing the quota rental charge is governed by a level of uncertainty. Other things being equal, companies would experience difficulties to pay more than their expected rent for a quota, if fees are in excess of rents in the fisheries. Johnson (1995) notes that rent capture based on this method can have negative impacts on the incentives facing members of the fishing industry to invest in cost-reducing activities. No doubt, this problem is worsened if captured rents bite into the normal profit returns to fishermen. A symptom of an excessive or near excessive charge may be seen in the number of companies failing to honour their rent payments, *ceteris paribus.* Due to uncertainty, there is no guarantee that the quota price does not underestimate or overestimate the expected resource rent. In lean years, the value of the quota for each company might not suffice to cover the costs of fishing as well as rent payments for the public purse. Thus, the likelihood for the dissipation of rents for a marginal fisherman looms large. Applying a quota rental charge is therefore an *ex ante* method in the sense that the fees are set before actual rents are known. It has the implication that fishers are expected to pay the charges irrespective of their current returns. It thus imposes different burdens on fishers.

ii. Profit charge

A profit charge is a common method of taxing businesses. It is an *ex post* method that captures rents as a fixed proportion of fisher profit, i.e.

$$R_{it} = \begin{cases} \rho\theta_{it}, \text{ if } \rho\theta it, > 0 \\ 0, \text{ otherwise} \end{cases}$$

where ρ is the profit charge rate and θ_{it} is the profit of fisher *i* at time *t*.

It is obvious that the profit charge only collects rents when profits are positive and presumes that the resource manager knows the profit profiles of fishers. It should, however, be noted that asymmetric information often exists between the government and the fishing industry. In other words, the government, not knowing the precise profit profile of fishermen, would mostly rely on the industry to provide this information. The profit charge method is, therefore, not without ambiguity. Grafton (1995) notes that in a situation where interest payments are deductible, fishers who made investment outlays with borrowed funds are favoured relative to those who made payments out of their own equity. In this sense, the profit charge is not uniform in its effect across fishers. It is, however, the only method of rent capture that promises not to leave fishers with an after charge loss, other things being equal. However, an attendant problem of this method is the high possibility to capture more than the resource rent. Grafton (1995) for example,

notes that at high rates of rent capture, a profit charge may capture a substantial proportion of intra-marginal rents of certain fishers while leaving other fishers with a larger share of the resource rent. However, the profit charge is flexible and changes with the value of the rent from the fishery. This is because the rent is captured after an account of profits is taken. One problem with a profit charge, not mentioned by Grafton, may occur when multi-national companies operate in the country levying the profit charge. This is the possibility of transfer pricing, where a company realises its profits in the country where profit taxation is the lowest. As many of the companies operating in Namibia have at least partial foreign ownership, this is a significant obstacle to profit charges.

iii. Lump sum charge

A lump sum charge is a uniform, fixed fee determined by dividing the desired total rent to be captured, R_t, by the total number of quota holders for fisher i at time t, i.e.,

$R_{it} = R_t/n_t$, where n_t is the number of quota holders at time t.

It is apparent that this method is simple in application once the desired level of rent capture is determined. Once this level is determined, the government simply imposes an identical charge on all quota holders. However, it cannot be assumed that all fishers hold identical quota allocations nor do they face identical costs. Furthermore, and despite its apparent simplicity, a once-off determination of rent does not allow opportunity for charges to vary with variations in the resource rent. Extraction of rents done in this form therefore imposes a heavier burden on the fishers with lower quota holdings and profits. This is in contrast to a lump sum charge per quota unit, which allows variations with the quota size.

***vi. Ad valorem* royalty charge**

An *ad valorem* charge captures rent as a percentage of the landed price of fish times the individual quota holdings, i.e.

$$R_{it} = \mu P_t q_{ti} \quad ,$$

where μ is the *ad valorem* charge rate, P_t is the landed price of fish at time t, and q_{ti} is the number of quota units owned by fisher i at time t.

This method of rent capture also seems to be flexible to variations in the value of the rent due to fluctuations in the output price. Grafton (1995) notes that such flexibility might be enhanced if the charge is tiered such that at a higher product price, a higher rate is charged and vice versa. This mechanism reduces the likelihood of collecting rent when fishers face losses. Similar to quota rental charges, an *ad valorem* royalty leaves fishers with identical profits, provided that all fishers are price takers and have identical costs.

5 ADVANCES IN RENT CAPTURE IN NAMIBIA

5.1 The quota fee mechanism

The system of rent capture in Namibia follows an *ad valorem* royalty charge. However, the charge rate is not only tailored to the landed value of fish, but also varies with the vessel category to achieve policy objectives such as those of Namibianisation and employment creation and retention. For all intents and purposes, the basic quota fee takes into account the value of the fish and such factors as the cost and profitability of fishing operations. This rate is subject to adjustment and it is conceived to vary between 5 and 15% of the landed value of the fish (MFMR 1991). Table 3 gives the differential quota fees of the hake fishery since 1995.

Table 3: Hake quota fee (in N$) by vessel category, 1995 – 2001 (MFMR 1995, MFMR 1999 and MFMR 2001)

		Fees per tonne	
Year	Type of vessel	Freezer	Wet
1995	Namibian	400	200
	Namibian-based	600	400
	Foreign-flagged	800	600
1999	Namibian	440	220
	Namibian-based	660	440
	Foreign-flagged	880	660
2001	Namibian	550	300
	Namibian-based	850	600
	Foreign-flagged	1450	1200

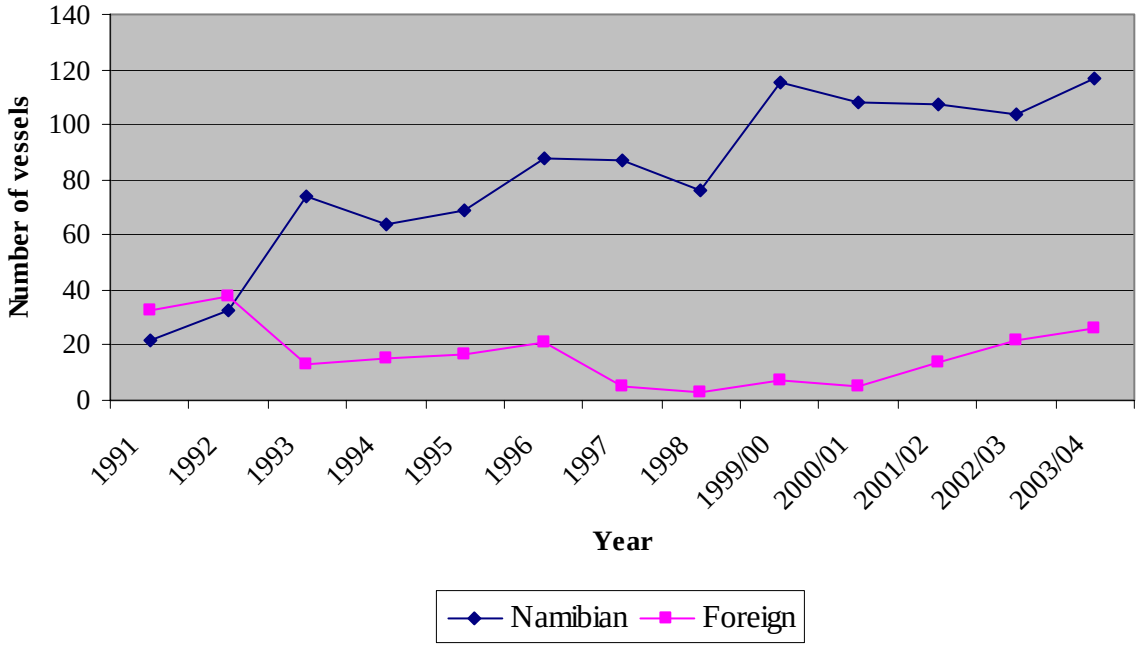
** US$1 = N$ 8,59 in December 2002*

Quota fees are charged on the nominal weight of the fish and payable on the full quota. Fishers may also 'return' to the government a portion of their quota allocation that they may not be able to catch due to unforeseen conditions. However, this has to be done a few months before the end of the fishing season in order for the government to be able to reallocate the quota to other fishers. Uncaught quota cannot be returned at the end of the season. Quota fees vary with the vessel flag and ownership categories (Table 3). Namibian vessels attract the lowest quota fee. A vessel is categorised as Namibian if it is registered or licensed in Namibia, permanently based in Namibia and flies a Namibian flag. In addition, at least 51% of the vessels' beneficial ownership should be held by

Namibian citizens and its crew complement is at least 85% Namibian. In this case, the quota fee payable is the lowest and it has remained more or less constant at about N$400/ton until 2001 when it increased to N$550/ton.

A vessel is categorized as exclusively foreign if it is not Namibian or Namibian-based. Namibian-based vessels are vessels that satisfy criteria for a Namibian vessel, except for the crew composition requirement. A foreign-flagged vessel with at least 85% Namibian crew is also classified as Namibian-based. Foreign vessels attract the highest quota fee. It is worth noting that in Namibia's rights-based fisheries, holders of fishing rights may engage any vessel licensed to fish in Namibian waters to harvest their quota. All vessel operators face identical, fishery-specific fishing costs, since the quota fee is not part of fishing expenses. During a fishing trip, a vessel can only target and carry a quota for one species (MFMR 2000). All other non-target species which are commonly unavoidable in a multi-species fishery are considered as by-catch and attract a by-catch fee if the proportion of by-catch exceeds a specified percentage of the target species catch.

This quota fee scheme has played a major role in increasing local participation in the hake fishery. Apart from local participation in the fishery in the form of property rights, a largely domestic fishing fleet has been realised as shown in Figure 3. However, the impact of quota fee charges on the economic performance of individual companies, particularly the local, new entrants to the fishery, is an interesting, empirical enquiry. *A priori*, it makes little sense to extract rents if individual fishermen are left with little or no profit for long-term investment.



Note: The category "Namibian vessels" includes Namibian and Namibian-based vessels.

Figure 3: Number of trawlers and longliners in the Namibian hake fishery by flag and year (MFMR 2002)

An interesting feature of the quota fee scheme in Namibia regards the circumstances under which the fee is charged. Quota fees are charged on the basis of the quota

allocated, without regard to the volume of fish actually caught. In other words, once the quota is allocated and accepted, right holders become liable for the payment of quota fee installments, unless extreme conditions do not allow for the harvesting of the quota. The fee applicable for uncaught quota is the fee that applies to a foreign freezer vessel, which is the highest possible rate (MFMR 2000). The rationale for this *modus vivendi* is to induce fishers to harvest their allocation in full. Under this system, right holders are ill-advised to underreport their catches. The observer system at sea and monitoring of landings ashore augment the provision of accurate account of landings. Table 4 gives the amount of government revenue generated from the hake fishery during the 1995 – 1999 period.

Table 4: Government revenue (N$ million) from the fishing industry, 1995-1999 (MFMR 1999, MFMR 2002)

Quota fee	1995	1996	1997	1998	1999	Total
All fisheries	90,600	46,500	72,200	75,200	91,100	375,600
Hake	63,500	34,200	55,000	52,300	67,900	272,900
Hake share(%)	70.1	73.5	76.2	69.5	74.5	72.7

The hake fishery alone accounted for no less than 70% of the government revenue from all fisheries during the 1995 – 1999 periods. The question to be raised is whether hake fishing entities in Namibia face positive economic rents in the presence of rent capture when the cost of fishing is considered. This question is no less important for the new domestic entrants to the fishery. Empirical evidence on the magnitude of rents in the fishery may be gleaned from the catching accounts of companies. The message for a resource manager keen on capturing rents from the fishery is that the cost of fishing may be substantial and, unless fishers are efficient in their operations, it is not sufficient to tailor resource rentals to the value of the fish in isolation from fishing costs. Further, it should be noted that new, domestic entrants to the industry face heavier financial burdens due to the high cost of borrowing and other capital market imperfections. Furthermore, the relative quota holding sets limits to each quota holder's return. In these circumstances, individual fishermen's returns may be low or even negative. It is therefore essential for royalties to be set on par with the fishermen's ability to pay. This is only possible if authorities are aware of economic returns from the fishing activity. In the Namibian context, the Annual Income and Expenditure Survey data provides an avenue for gathering this evidence (MFMR 2002).

6 HAKE INDUSTRY PROFITABILITY DATA

An estimate of the size of the current resource rent in the hake fishery during 2002 can be obtained from the Annual Income and Expenditure Survey (AIES) (MFMR 2002). This comprehensive survey was first commissioned in 1994 and covers such broad areas as industry expenditure, earnings and asset value. However, it was not until 2002 that the questionnaire was modified to distinguish between fishing and processing activities. This distinction is particularly important for this study, as the determination of resource rent should be solely confined to returns from the fishing activity. The data from previous fishing seasons lack this distinction, and could not be used to answer the type of questions posed here. This is particularly so for companies with a high degree of vertical integration. For this reason, this paper relies on the data for the 2002 survey year.

The distinction between revenue from and cost due to fishing and processing is not easily made, especially for vertically integrated companies. It is, however, to be appreciated that fishing enterprises have made stern efforts to separate these numbers. Since this is the first time this classification is sought from the industry, it is possible that some enterprises might have underreported some of the offshore numbers. In particular, it is not uncommon for "wet fish" landings to be associated with onshore processing. This perception might have led to the possible underreporting of the landed value of wet fish on the revenue side.

The data available for the analysis covers 29 companies, representing 76% of the 38 hake right holders. The total quota holding for this sample is approximately 80% of the 181,000 tons quota allocated to hake right holders for the 2002/3 fishing season. Out of the 29 companies, seven are large, vertically integrated companies, with significant investment in fishing vessels and onshore processing facilities. This group of companies accounts for 36% of the quota allocated for the 2002/3 season. While data from these companies appear to be expertly collated, the ex-vessel sales value for wetfish landings might be underreported as noted earlier, since processors are more interested in the value of the final product. In fact, for a vertically integrated company, no ex-vessel price exists in reality. However, many companies do calculate an ex-vessel price by looking at the running costs of each vessel and finding the price of fish that makes the vessel operations break-even. However, as companies will generally not take into account fixed cost or the share of fishing in, for instance, administrative expenditures, this ex-vessel price is almost certainly an underestimate of the true ex-vessel price.

The second group comprises nine medium-sized companies which actively fish, but do not own processing plants. This group accounts for approximately 17% of the quota allocated. The third group consists of 13 small companies and new entrants to the fishery with virtually no fishing or processing capacity of their own. New entrants to the fishery could not, perhaps, be expected to have fishing experience or processing capacity due to Namibia's political past of systemic exclusion of the indigenous persons from the mainstream of the economy. The quota holding for this group of companies during the 2002/3 seasons is about 26% of the total allocation. It is of some importance to note that the quotas for this latter group are harvested by the larger, operating partners under an

agreement. An intriguing aspect regarding the distinction between vertically integrated and non-vertically integrated companies is whether rent capture imposes different burdens on these two groups of companies.

As noted previously, the determination of the size of resource rent is limited to income from, and expenditure due to fishing. Hence, only such items as the ex-vessel sales value of fish, quota usage and vessel charter payments are included in the income bundle. Income due to processing, rentals and transfer payments are excluded. By the same token, expenditure items relating to onshore activities, such as onshore personnel expenditure, utilities, processing inputs, machinery and equipment, and quota purchases do not enter the calculations. This classification is not simple, as the practical dividing line between fishing and processing is not clear-cut. This ambiguity does not only have an influence on the choice of assets deemed to pertain exclusively to fishing, but also on the determination of wear and tear of such assets. Further, an allowance has to be made for the inclusion of the opportunity cost of capital assets harnessed to fishing, since an estimate of resource rent is based on a broader, economic profit rather than accounting profit. Thus, to a certain extent, the data have to be adjusted to account for these factors.

Three kinds of adjustments were made to the data. The first relates to depreciation of assets. The reported depreciation for vessels was modified to correct for distortions arising from typical accounting practice of under-valuing assets at historical book values. To account for real depreciation, an assumption needs to be made about the working life of the assets. In treating this aspect for the New Zealand fisheries, Lindner *et al.* (1992) observed that the reasonable life span of a well-maintained fishing vessel is about 30 years. This observation translated into a "declining balance" depreciation rate of about 5% per year, which was applied to arrive at an estimate of the real depreciation of physical assets. This approach was used to estimate real depreciation of vessel assets in this study.

The second aspect regards the incorporation of the opportunity cost of capital so as to permit the determination of economic profit from the fishery. For companies with significant onshore investment, the separation between capital assets harnessed exclusively to fishing and processing is not apparent. This is true for the vertically integrated companies and medium-sized fishing enterprises. For these two groups of companies, only the vessel assets were considered in the determination of opportunity costs. For companies not wholly owning vessels nor processing facilities, the entire capital base was used. The determination of opportunity cost of capital requires an estimate of the real rate of return on assets in their alternative use elsewhere in the economy. Based on a riskless rate of 5%, and a company tax rate of 28%, Lindner *et al* (1992) estimated that the required real rate of return on fishing industry assets is about 9% after tax. Following Lindner *et al (*1992*)*, this required real rate of return on fishing industry assets was applied to establish the opportunity cost of capital employed. However, this rate of return is likely to be an underestimate in the Namibian context as the company tax in Namibia is slightly above the rate considered in the New Zealand case.

Besides the apparent understatement of the real rate of return on assets, two additional reasons account for the possible underestimation of the opportunity cost of capital. Firstly, there is no doubt that part of the onshore assets is devoted to supporting the fishing activity. Secondly, the data indicate that smaller companies in joint-venture operations have underreported their asset holdings. To the extent that these capital assets were excluded, the opportunity cost item appears to be underestimated.

Other adjustments made were mechanical in nature and have to do with how cost items were reported by some companies. For example, some companies reported vessel repair cost and payment of fishery fees as "onshore" expenditure. These obvious items were subsequently included among the offshore expenditure items. For companies which are exclusively involved in the fishing activity, all cost items were construed to be part and parcel of the offshore activities, save for such items as quota purchases and transfer payments.

6.1 Estimated resource rent in the fishery

Total hake industry fishing revenue and costs for 2002 are set out in Table 5. Taking it for granted that the purpose of the fishery management regime is to increase the net economic gains from the fishing activity, the estimated outcome from the data is not very depressing. Overall, the net economic gain from the fishery appears to be positive and in excess of N$34 million. This is in spite of the apparent underestimation of some of the revenue items and aggregate fishing costs. Real depreciation and opportunity cost items are underestimated due to the underreporting of asset holdings and the low rate of return on assets used in this study.

Table 5: Estimated net gains (in N$ million) from the hake fishery (MFMR 2002).

Revenue/Expenses	Amount (N$ Million)
Closing Stocks	21.634
Fish Sales	733.651
Commission for catches	7.475
Fees from use of quota	13.188
Vessel charter fees	16.520
Total Revenue	**792.467**
Opening stocks	14.126
Employment & payments	256.052
Materials, insurance, repair & maintenance	151.034
Fuel and lubrication	165.100
Fishing gear	10.576
Fishery fees and levies	26.084
Depreciation	33.615
Opportunity cost	50.272
Unloading, storage & freight, harbour and charter fees	36.984
Bank charges and other expenses	14.449
Total expenses	**758.291**
Net economic gain	**34.176**
% of revenue	*4.3*

The combined cost of crew, fuel and vessel maintenance alone accounts for no less than 76% of total expenses and approximately 78% of the landed value of fish. The relative share of the cost items is given in Table 6.

Table 6**:** Percent distribution of catching costs from the hake fishery (MFMR 2002)

Expenses	Percent
Opening stocks	1.9
Employment and payments	33.8
Materials, insurance, repair and maintenance	19.9
Fuel and lubrication	21.8
Fishing gear	1.4
Fishery fees and levies	3.4
Depreciation	4.4
Opportunity cost	6.6
Unloading, storage & freight, harbour and charter fees	4.9
Bank charges and other expense	1.9
Total Expenses	**100.0**

The aggregate indicators given in Table 6, however, disguise considerable variation across heterogeneous fishing companies. In particular, it can be shown that the proportion of the items with the highest cost is concentrated among the large, vertically integrated companies. In the Namibian context, it seems natural to categorise the hake industry into three groups of companies as described earlier.

Large fishing operators appear to face negative economic returns from the fishing activity (Table 7). The relative cost of vessel operation and crew compliment significantly contributes to this outcome. As noted previously, revenue due to fishing for this group of companies might have been underreported. In fact, companies in this group were still able to make some social contributions, although such contributions could not be entirely attributed to returns from fishing. Future surveys will improve on this result, as companies adapt to the information requirement.

Table 7: Estimated net gains from the hake fishery (in N$ million) by company category (MFMR 2002)

Revenue/Expenses	Fishers and owners of Processing Plants	Fishers without Processing Plants	Smaller companies associated with Major Fishers
Closing stocks	8,270	13,364	0,000
Fish sales	456,830	194,436	82,385
Commission for catches	0,00	7,475	0,00
Fees from use of quota	0,672	6,339	6.178
Vessel charter fees	0,900	15,620	0.00
Total Revenue	**466,672**	**237,232**	**88,563**
Opening stocks	0,301	13,825	0,000
Employment and payments	183,574	59,413	13,065
Materials, insurance, repair and maintenance	101,660	45,015	4,359
Fuel and lubrication	107,629	50,459	7,012
Fishing gear	7,793	1,369	1,414
Fishery fees and levies	16,220	5,468	4,396
Depreciation	18,912	6,091	8,612
Opportunity cost	34,042	10,800	5,430
Unloading, storage & freight, harbour and Charter fees	10,474	17,467	9,044
Bank charges and other expenses	2,275	1,505	10,668
Total expenses	**482,881**	**211,411**	**63,999**
Net economic gain	**-16,209**	**25,821**	**24,564**
Social contribution	*1,466*	*1,924*	*0,803*

The case of smaller companies and new entrants to the fishery is intriguing. The largest share of net returns from fishing that they face is, at best, misleading. There are several reasons for this distorted picture. Firstly, the smaller companies are jointly associated with the large companies through some form of operational agreements. These agreements commit the large-scale operators to harvest and process the quota of their smaller partners, albeit at a cost. However, cost data from this group of companies largely underreports the payments made for fishing services rendered. It is thus intractable to infer these cost items from the catching accounts of the large, operating companies. There is weak reparability between the two groups, with some cost and revenue items wholly reported by the large companies. In fact, from the data and for the purpose of this study, it makes sense to conceive of these two groups as a single entity. For certain, this limitation precludes an independent analysis of the impact of rent capture on these two groups of companies.

Nevertheless, even when considered together, large companies and their small, joint-venture partners seem to encounter high fishing costs relative to revenues as shown in Table 8**.** It is perhaps the second group of companies that appears to enjoy positive economic returns from fishing.

Table 8: Combined catching accounts (N$ Million) for large and small companies,(MFMR 2002)

Revenue/Expenses	Processors and Associates	Fishers without Processing Plants
Closing Stocks	8,270	13,364
Fish Sales	539,216	194,436
Commission for catches	0,00	7,475
Fees from use of quota	6,849	6,339
Vessel charter fees	0,900	15,620
Total Revenue	**555,235**	**237,232**
Opening stocks	0,301	13,825
Employment and payments	196,640	59,413
Materials, insurance, repair and maintenance	106,019	45,015
Fuel and lubrication	114,641	50,459
Fishing gear	9,207	1,369
Fishery fees and levies	20,616	5,468
Depreciation	27,524	6,091
Opportunity cost	39,472	10,800
Unloading, storage & freight, harbour and charter fees	19,517	17,467
Bank charges and other expenses	12,944	1,505
Total expenses	**546,880**	**211,411**
Net economic gain	**8,355**	**25,821**

6.2 The impact of rent capture

It was shown in section 5.2 that overall resource rent from the fishery is positive and in the neighbourhood of N$34 million. At this modest level, how much rent captured is important. The net returns to the industry following rent extraction are shown in Table 9.

Table 9: Returns to the state and hake industry (N$ million) by company category (MFMR 2002)

Item	All Companies	Large & operating partners	Medium-sized
Fish sales (ex-vessel)	733,651	539,216	194,436
Other	58,816	16,019	42,796
Total Revenue	792,467	555,235	237,232
Total Expenses	758,291	546,880	211,411
Net economic gain/rents	**34,176**	**8,355**	**25,821**
% of total revenue	4.3	1.5	10.9
% of landed value	4.7	1.5	13.3
Returns to the State	**56,324**	**42,226**	**14,098**
% of total revenue	7.1	7.6	5.9
% of landed value	7.7	7.8	7.3
% of total rents	164.8	505.4	54.6
Net Returns to industry	**-22,148**	**-33,871**	**11,723**
% of total rents	-64.8	-405.5	45.4

The returns to the state in quota fee payments amounts to N$56.3 million and in excess of the estimated rents from the fishery by not less than N$22.1 million or 64.8%. The industry has to account for this excess amount from their normal profits from fishing or other operations to honour their rent payment obligations. When considered by category, exclusively fishing companies are better off as rent capture leaves this group of companies with about 45% of the rents, over and above normal profits. The heavier post-rent capture impact on vertically integrated companies and their partners is apparent, but the possible underestimation of sales revenue should be borne in mind. Figure 4 reproduces the post-rent capture net economic returns to industry

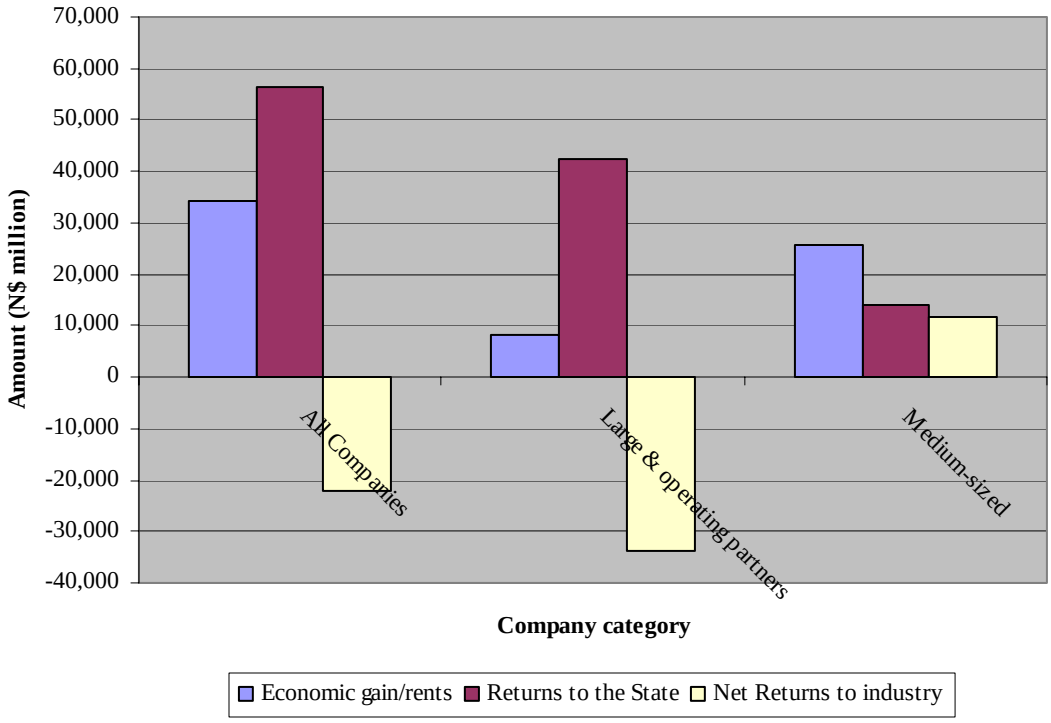


Figure 4: Net returns to the state and hake industry (N$ million) (MFMR 2002)

Two direct impacts of rent capture on industry returns are, therefore, apparent. Firstly, it reduces or even dissipates resource rent, which, in its alternative use, could be used for reinvestment in the fishery and/or related activities. Secondly, when rent capture bites into normal profits, the fishermen's financial ability to invest and meet operational costs is greatly reduced. As rents are not uniformly spread across companies, the seemingly high rate of capture does not only exhaust the resource rent, but it also imposes different burdens on companies, depending on the relative size of resource rent that they face.

When considered together, vertically integrated companies and their joint-venture partner appear to be the most affected, due to lower returns from fishing that they face. On the

aggregate, only medium-sized companies actively fishing their quotas appear to be facing positive returns and thus able to bear the full cost of rent capture and retain part of the rents in addition to normal profits. The payment of resource rentals is, however, a responsibility of each holder of a fishing right. For vertically integrated companies, earnings from processing perhaps compliment their ability to make payments. The case of smaller companies and new entrants to the fishery is precarious as their earnings are not as diversified. It is of some interest to note that not all of the 29 companies have made rent payments during the 12-month period. *A priori*, it is reasonable to assume that fishing companies would not prefer to come on collision course with the quota-allocating agency through non-payment, unless they face liquidity constraints. Specifically, 7 of the 29 companies did not make quota-fee payments during the 12-month period, 4 of which belong to the small and new entrants group. Companies with outstanding rent payments might not only be facing low or even negative net returns, but the rent payable probably amounts to a significant proportion of their normal profit. In these circumstances, liquidity constraints may be a limiting factor.

The empirical results discussed above follow from the application of the method of rent capture in Namibian fisheries. An *ad valorem* royalty charge is an *ex ante* method of rent capture. The charge rate is, in other words, set before the expected resource rent level is known. Thus, this method has the implication that fishing companies may be expected to pay the charges when their current returns are low or negative. Under these circumstances, fishing companies will have to part with their normal profits from fishing or other operations to meet their rent payment obligations.

At worst, for companies facing negative returns, rent extraction is destined to bite into their normal profits from fishing. In this respect, non-vertically integrated companies have the option, if any, of borrowing against their future allocations to meet their current rent payments. A symptom of this result is reflected by the number of companies unable to meet their rent payments as required by regulation.

7 MAIN CONCLUSIONS AND POLICY IMPLICATIONS

The institution of the rights-based fisheries management in the form of individual harvesting rights in the Namibian hake fishery has succeeded in improving the economic performance of the fishery. Taking it for granted that the purpose of fisheries management is to increase the flow of net economic gains from the fishing activity, the costs of fishing are obviously among those to be subtracted from gross revenues to arrive at the net economic gains.

The relative success of individual quota management has changed the issue of levies in fisheries from one of correcting for the externality problem to a question of distributional equity between holders of fishing rights and public ownership of the resource. Some, or even all rents generated in the fishery may be extracted for direct benefits to society. Rent capture, however, should not bite into normal profits from fishing. The message for a resource manager keen on rent payments is that the size of the resource rent in the fishery is the limiting factor of how much could be charged from the fishery. When all rents are extracted, the opportunity for re-investment of these returns in the fishery and related activities is foregone. Resource rentals that exceed actual rents in the fishery reach out into the normal profits from fishing and thus come on collision course with the fishermen's ability to meet operational costs.

The data used in this study is from the Annual Income and Expenditure Survey (AIES) for 2002, primarily because this is the first set of data that distinguishes between fishing and processing. Since it is for the first time this classification is sought from the industry, it is possible that vertically integrated companies might have misinterpreted "offshore and onshore" classification with "freezer and wetfish" operations, especially in an environment where the latter distinction is important. To the extent that this misinterpretation predominates, the landed value of fish and thus revenue are likely to be under-reported. Aggregate fishing costs too, appear to be underestimated due to, *inter alia*, underreporting of asset holdings and the low rate of return to assets assumed in this study. There is thus a *prima facie* case to corroborate the findings from this study with improved data from future surveys.

The overall resource rent in the Namibian hake fishery in 2002 is positive and in excess of N$34 million. This net gain, however, is not evenly spread among holders of fishing rights. With the exception of medium-sized companies which actively harvest their quota, vertically integrated companies together with their operating partners seem to encounter high operational costs relative to returns from fishing.

The returns to the state in quota fee payments during this period amounts to N$56.3 million and in excess of the estimated rents from the fishery by N$22.1 million or 64.8%. The industry has to account for this excess amount from their normal profits from fishing or other operations to honour their rent payment obligations. It is of some importance to note that 7 out of the 29 companies covered in this study did not make any quota fee payment during the 12-month period.

The rate of rent capture relative to rent size may be high, but the cost of fishing is even higher, particularly for the large companies. In fact, the total amount of N$56 million collected by the state in rent payment only amounts to 7.7 % of the landed value of fish in line with the policy prescription of 5% - 15%. However, the total cost of fishing exceeds the landed value of fish by about 3.4%. The combined cost of crew and vessel operation accounts for three-quarters of fishing costs.

At this seemingly high level of rent capture relative to rent size, the overall net returns to industry are below zero. The majority of companies will have to part with portions of their normal profits from fishing or other operations to meet their rent payment obligations. The negative net returns to industry do not auger well with the industry's ability to invest in cost-reducing technology and diversify its operations.

The empirical result from this study has implications for the application of the method of rent capture in Namibian fisheries. The charge rate is set before the expected resource rent level is known. Thus, this method has the implication that fishing companies may be expected to pay the charges even when their current returns are low or even negative. Quota fees have been periodically revised upward in accordance with the increasing landed value of fish over time. Equally important, however, is the consideration of the cost of fishing, since fishing costs are among those to be subtracted from fishing revenues to establish the resource rent level. This aspect appears to have lagged. It is therefore important that the rate of rent capture be brought in symphony with the average historical level of the resource rent in the fishery.

A rate of capture tailored to the previous levels of resource rent in the fisheries calls for detailed information about catching costs, revenues and fish price, which might not be available in the ministry in a form relevant to this task. The need to continue with, and improve on the collection of data used in this study cannot be overemphasized. A thorough analysis of these data would generate a wealth of information that is invaluable in keeping public resource rentals in line with the size of the resource rent in the fisheries. There is a clear need for similar empirical assessment in other quota-managed fisheries to determine approximate resource rent levels.

A component of the Namibian hake fishery that holds the potential for generating additional rents and investment regards the new entrants to the fishery. However, the contribution of the new entrants could not be independently quantified in this study as the information is inseparably linked with that of their large, operating partners. This limitation appears to be borne out of the complexity of operational arrangements than mere book-keeping, particularly in cases where the operating partner is not a right holder. There is a clear need for assessing whether the present operational agreements are the most efficient in developing entrepreneurial skills and most conducive to the emergence of fully-fledged fishing companies. Consideration should be given as to whether the present institutional arrangements are the most efficient in providing access to credit facilities and information regarding the sources of fishing technology and inputs.

It is no doubt important to safeguard the practical advances made in the reorganisation of the Namibian hake fishery with regard to the Namibianisation policy and employment creation and retention. However, there is little or no ground to charge rents more than what the fishery can generate. Account for the resource rent should be consistently undertaken in all quota-managed fisheries as the data improves. In the intervening period, the quota fees should be kept unchanged, allowing gains from increasing value of the fish to compensate for the excess in resource rentals.

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APPENDIX 1: HAKE COMPANIES FIXED ASSET SCHEDULE BY COOMPANY CATEGORY

Table 1A: Hake companies fixed asset schedule (in thousand N$) by company category (MFMR 2002)

Asset	Large & operating partners	Medium-sized	Total
Boat Value	376.630	106.860	483.490
Land Value	27.262	0.802	27.263
Buildings Value	109.244	5.756	115.000
Vehicle Value	10.575	1.019	11.594
Machinery & Equipment	97.428	4.437	101.865
Total Fixed Assets	**621.139**	**118.073**	**739.212**

APPENDIX 2. HAKE CATCHES IN THE NAMIBIAN WATERS, 1965-1989

Table 2A: Hake catches in the Namibian waters (1000 tonnes), 1965 - 1989

Year	Catch
1965	193,2
1966	334,6
1967	394,4
1968	630,4
1969	526,7
1970	627,2
1971	595,3
1972	820,1
1973	667,9
1974	514,5
1975	488,1
1976	600,9
1977	430,4
1978	379,3
1979	310
1980	168,8
1981	210,9
1982	306,5
1983	339,4
1984	370,3
1985	411,5
1986	380,9
1987	299
1988	334,9
1989	325,8

APPENDIX 3. NUMBER OF LICENSED VESSELS IN THE HAEK FISHERY 1991-2002/3

Table 3A: Number of licensed vessels in the hake fishery, 1991 -2002/3

	Number of vessels		
Year	Namibian and Namibian based	Foreign-flagged	Total
1991	22	33	55
1992	33	38	71
1993	74	13	87
1994	64	15	79
1995	69	17	86
1996	88	21	109
1997	87	5	92
1998	76	3	79
1999/00	115	7	122
2000/01	108	5	113
2001/02	107	14	121
2002/03	104	22	126