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AN ECONOMIC ANALYSIS OF RESTRUCTURING THE SOUTH AFRICAN HAKE QUOTA MARKET

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Hake is the most valuable fisheries species in South Africa, with an estimated landed value of R658 million in 1997. The fishery is presently managed under an individual quota system, where total allowable catch (TAC) is set annually and divided up amongst quota holders according to past performance, without quota holders having to pay for it. Fundamental restructuring of the South African hake quota market is however due to take place in the near future as recommended by the White Paper on Marine Fisheries Policy (1997). Factor analysis of data collected from a postal survey of existing South African hake quota holders and rejected hake quota applicants suggests that distinct differences in attitudes towards restructuring exist amongst respondents. Four factors, representing groups of respondents defined as (1) applicants, (2) quota holders, (3) small scale respondents (comprising of both applicants and quota holders), and (4) larger, longer established quota holders, sharing similar attitudes towards restructuring were extracted. It was also calculated that a substantial annual rent of approximately R279 million is generated by the South African hake industry, which is presently harvested free of charge by those issued with quota. It is stated policy of the White Paper to capture these rents, however methods of accomplishing this have not been well accepted by the industry. This study aims at providing some solutions to these problems of restructuring.

1. INTRODUCTION

Hake is the most valuable fisheries species in South Africa, with an estimated landed value of R658 million in 1997(1996 landed mass has been used in conjunction with 1997 prices) (De Swart, 1998). Quota allocation for Hake, along with other fisheries, has been targeted for restructuring according to the White Paper on Marine Fishery Policy (Marine Fisheries Policy for South Africa, 1997). At present the fishery is managed under an individual quota system, where total allowable catch (TAC) is set annually and divided up amongst quota holders free of charge according to past performance. However the stated objectives of the White Paper include *inter alia* the following:

- Quota will be issued as a percentage of TAC,

- Quota rights will have to be purchased via a public tender in a once-off bidding process (the State not being compelled to necessarily accept the

highest bid), with the purchase price, including the cost of managing the resource, being paid annually,

- The right will be divisible, transferable and inheritable, with a ceiling on maximum tonnage associated with a single quota holder,

- The right will revert back to the State within the allotted period, for example, a maximum term of 50 years will revert at a rate of two percent per year and a minimum term of ten years will revert at a rate of ten percent per year, i.e., the entire quota share purchased will reverted back to the state over the allotted period, and

- As not all participants may wish to acquire long-term rights, provision is made for the establishment of a commercial public company to enable industry participants to lease rights for a shorter time period of one or more seasons. The above mentioned company will then lease quota to private individuals by holding an auction where rights are allocated on a "competitive" basis to bidders who compete on criteria of black economic empowerment and previous participation in the industry (Marine Fisheries Policy for South Africa, 1997).

Many of these proposed methods of restructuring are seen to favour smaller, previously disadvantaged individuals wishing to gain access to the hake industry, at the expense of existing members who feel they have a legitimate claim to a resource which they have effectively rebuilt over past years. Many recognise redistribution as a necessary process of political reform, presently characterising several sectors of the South African economy, but disagree on various methods proposed by the White Paper. A survey was conducted to access attitudes towards restructuring of existing quota holders together with those attempting to enter the industry (applicants). To the authors knowledge no other local and international work has been done on assessing the opinions of commercial fishery participants faced with the problem of restructuring. The paper concludes with a discussion of policy implications of results obtained.

2.   COMMON OWNERSHIP AND INTERNATIONAL EXPERIENCES

Fisheries management is not only responsible for providing a sustainable resource, but also achieving economically efficient utilisation of the present resource, within the realms of a socially equitable framework. Gordon (1954), observed that the question was no longer whether fishery resources needed to be managed, but rather which managements strategy was best suited to a particular fishery.

According to Wilen (1992), the biological control method of setting a TAC, or upper limit, on the quantity of fish harvested in a particular season, is the minimum standard to which a management regime ought to be held. Arnason (1992a), goes further to say that the TAC method works well to protect fish stocks but is economically unsuccessful at obtaining the efficient harvesting of fish stocks.

Access restrictions, in the form of licenses, result in "capital stuffing" (the enlarged fishing power of vessels) in a race to catch available fish stocks (Waters, 1991). Consequently, access restrictions are not seen as an economically viable solution to fishery management. Input restrictions, as opposed to access restrictions, aim to control the method of fishing and not the number of fishing units. However, potential gains from input restrictions, in the biological sphere, are eroded by having to control the use of <u>all</u> inputs, to avoid making the use of one input more attractive than another (Campbell and Haynes, 1990). There are a variety of different regulatory measures aimed at restricting specific inputs, such as:

* limiting methods of harvesting,
* closing certain sensitive areas and seasons,
* limiting types of gear (mostly in the form of limitations on nets and mesh size), and
* limiting total effort expelled on fishing (often in the form of labour limitations).

All these methods have an inherent weakness in that any limitation can simply be avoided, and the identical outcome obtained, by changing the resource mix in favour of a non-restricted input. Access restrictions and input restrictions create an ever-increasing spiral of management needs in an effort to close loopholes uncovered by fishers. Each regulatory adjustment offers temporary relief to fish stocks, but over time, additional effort will create the need for still more restrictions (Waters, 1991).

Crutchfield (1961), maintains that taxes are theoretically the ultimate technique to ensure efficient utilisation of resources. In theory, a tax exactly equivalent to the unpaid resource rent, would make private factor costs equal to social costs (Cassidy, 1973). Determining the precise magnitude of such a tax would however require vast amounts of information, with authorities having to solve the social optimality problem as well as each firm's profit maximising function (Arnason, 1990). Fishers as well as politicians dislike the idea of taxes, and for this reason, along with high administrative costs, taxes are not seen as a viable management option (Cassidy, 1973).

Individual transferable quotas (ITQs) have been widely heralded as the future in fishery management (Christy, 1973; Moloney & Pearse, 1979; Major, 1991). With this technique, an annual TAC is set and then divided up amongst quota holders according to the proportion of quota held by the individual or company. Quota holders then allocate their time and capital in the most cost effective manner, taking their share of the TAC at minimum cost (Hanneson, 1992a). By making quota transferable, it ensures the TAC is taken at the socially optimal level, as quota gravitates from less efficient to more efficient users (Randall, 1981).

The ITQ method of management has been successfully applied in New Zealand, where variable ITQs were allocated in perpetuity, according to past performance (Boyd & Dewees, 1991 and Annala, 1996). ITQs were however, initially allocated as a specific tonnage, but incorrect stock assessments forced government to later change to a proportional allocation system as the New Zealand government had to buy back excess quota at a cost of NZ$ 45 million. The flexibility of ITQs has also been used to buy quota (which is then deemed non-transferable) to settle Maori claims on historic fishing rights (Bergh & Barkai, 1993). In Chile, rights to fish certain resources are allocated by auctioning ITQs. A certain percentage of the ITQ then relapses to the government each year and must be repurchased. These ITQs may be divided, transferred, sold and rented (Bergh and Barkai, 1993). In Australia, ITQs are issued according to a formula that takes into account both past performance as well as investment commitments. In both Australia and New Zealand, quota is initially distributed free of charge, and there is limited taxation of catches or of quota held. In New Zealand, previous plans to impose a resource rent tax have been shelved, and the fishery now pays only a small percentage of what it costs to manage. In Australia, it is a stated policy objective that the fishery should pay for its own management (Hanneson, 1992b). The Netherlands has adopted an ITQ system whereby individual <u>vessels</u> are issued quota and these rights are then transferable with the vessel (Symes & Crean, 1995). In Iceland quota is allocated according to past performance by means of two formats:

- According to a vessel's catch in a certain base year, or

- the vessel's average share of the TAC over a three year period prior to ITQ introduction.

Quota share is permanent, divisible and fully transferable (Arnason, 1992b). In Norway the TAC is divided between two groups:

- vessels which exceeded a certain catch in one of the preceding three years are issued quota according to the size of their vessel (smaller vessels benefit from the system), and

- vessels not exceeding a certain catch are included into a group which fish from a common quota (Hanneson, 1992b).

Achieving a sustainable management policy is in itself a difficult task, with all the above management alternatives applicable to specific fishery characteristics. South Africa's major fisheries currently operate under a system of individual quotas and this system has been particularly successful in rebuilding depleted hake stocks. However, determining who is entitled to these rights and how they should be allocated so as to be equitable and fair to all parties, is a monumental task. Information on the latter is provided in this study.

3.   DATA SOURCES AND CHARACTERISTICS OF RESPONDENTS

The 1997 Hake Quota Register, as well as a register of unsuccessful quota applicants was obtained from the Department of Sea Fisheries. Sixteen quota holders and 25 unsuccessful applicants were then sampled by means of a postal survey, on aspects regarding restructuring.

Data revealed that the size of allocation differed vastly amongst quota holders and can be broken up as follows; three respondents received less than 200 tons, eight between 200 and 499 tons, two between 500 and 999 tons, and three in excess of 1000 tons. Those companies who receive in excess of 1000 tons also harvest the majority of the hake catch, thereby causing an imbalance in the fishery, with five companies (three of which replied to the questionnaire) dominating the hake industry.

Fifty percent of quota holders (n = 16), indicated quota should be allocated as a percentage of TAC, whereas 83 percent of applicants (n = 23) advocate a fixed tonnage system, where tonnage allocated does not vary from year to year in line with fish stock fluctuations. Applicant support for a fixed tonnage system may be representative of a minimum threshold tonnage below which small operators would not survive the ill effects of poor years.

Quota holders and applicants stated a preference for quota with a longer term of tenure, with only ten percent of all respondents (n = 29) supporting the present one year tenure period. Preference for a longer tenure period can be attributed to large investments in resource assessments, harvesting and processing equipment, and marketing infrastructure and networks.

Opinions regarding the accumulation of quota for reallocation to new participants are presented in Table 1. Sixty two percent of quota holders and 59 percent of applicants support rapid reallocation of quota (within five years). It was expected that existing quota holders would opt for a gradual change to the present quota allocation structure from which they benefit. These figures however, seem to indicate the contrary. This is due however, to responses from quota holders being dominated by small to medium size operators who constitute the majority of the quota register, but receive only a small proportion of the quota. Data show this subset, together with applicants, to be unsatisfied with the substantial proportion of quota presently held by a few large companies. This seems to indicate that policy makers have the support of all existing quota holders to reallocated quota to smaller operators, but special consideration needs to be given to companies currently holding quota who voluntarily held back on past catches to allow stocks to recover and have invested heavily in exploring new resources. These companies should not be penalised for their efforts, and any policy should take into account any past conservation and investment (Department of Environmental Affairs and Tourism, 1996).

Table 1:   Quota holder and applicant opinion on methods of accumulating quota for reallocation to new entrants, 1997

Method of Accumulating Quota for Reallocation	Quota Holders (n = 16)		Applicants (n = 23)	
	Frequency	%	Frequency	%
Once-off percentage decrease	**5**	**62**	**10**	**59**
Percentage decrease over 1 to 5 years	**5**		**4**	
Percentage decrease over 6 to 10 years	0	0	5	20
Wait for TAC to increase	6	38	4	16

According to Table 2, (a five category scale ranging from 'strongly disagree' to 'strongly agree' with the statements given, was used to elicit the intensity of respondents' opinions), 94 percent of quota holders and 92 percent of applicants support the self-utilisation of quota being a prerequisite for allocation. This concept, which is again advocated by the White Paper, has been policy in the past, but has not always been strictly enforced. Attitudes towards the issuing of 'paper' quota (quota not utilised directly by holder), which is in essence the opposite of self-utilisation, were therefore also examined, and opposed by all quota holders and 68 percent of applicants. This further emphasises support for the enforcement of self-utilisation.

Table 2:   Initial methods and conditions of allocation to quota holders and new entrants, 1997

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Government regulation, where government or allocation board issues quota to quota holders who **must use quota themselves** in order to qualify for allocation	Quota holders	**11**	**4**	0	0	1
		94 %				
	Applicants	**16**	**6**	1	1	1
		92 %				
Auction quota to <u>everyone</u>, and successful bidders are then permitted to buy or sell quota freely	Quota holders	0	1	1	**6**	**8**
					93 %	
	Applicants	1	1	1	**8**	**14**
					92 %	
Auction quota to <u>new entrants</u> only	Quota holders	4	1	0	**6**	**5**
					69 %	
	Applicants	1	2	0	**4**	**18**
					88 %	

Ninety-three percent of quota holders and 92 percent of applicants opposed auctioning quota to <u>everyone</u>, while auctioning quota to <u>new entrants</u> only was opposed by 69 % of quota holders and 88 % of applicants (Table 2). The high percentage of applicants opposed to auctioning quota was contrary to prior expectation. It was hypothesised that those applicants unable to acquire quota via present allocation channels would opt for a system where quota was auctioned in a free and open market. These figures suggest that White Paper proposals to implement a bidding system, where small operators may purchase rights on a short-term basis, may encounter resistance.

4.   QUOTA MARKET ACTIVITY

No permanent transfers of quota have taken place in recent years, however rental transfers are common (Fourie, 1997). In 1995 and 1996, five major deep sea trawl operators caught 87 percent and 85 percent respectively, of the total hake catch (Department of Sea Fisheries, 1997).

Quota holders indicated 1997 quota was renting for prices ranging from R1.75/kg to R1.90/kg (mean = R1.84/kg) (n = 8), a figure which is consistent with information received from telephonic and personal interviews conducted with industry members (See Figure 1, distance BC). This figure combined with 151 701 tons of hake allocated in 1997 (distance OG), amounts to R279 million in annual hake quota rents (area ABCD). Figure 1 is adapted from Doeringer & Terkla (1995) depicting the utilisation of a common ownership resource.

Figure 1:   Demand for hake quota and quota rents in South Africa, 1997

The difference between private ownership and common ownership of a resource is demonstrated in Figure 1. The optimal level of utilisation from society's point of view (OG), occurs under private ownership where (marginal cost) MC = VMP (value of marginal product). At this point, an additional unit of cost yields an equivalent unit of revenue. It is not known whether the current allocation of 151701 tons is more or less than the optimum level (OG in Figure 1). For illustrative purposes this quota allocation is shown at the optimum level in Figure 1, with quota rent being the vertical difference between the VAP and VMP curves. In the absence of control, the open access (or uncontrolled common ownership) result prevails, where MC = VAP (value of average product) and OI units of the resource are harvested. At this point, no individual harvester is able to extract any share of rent generated by an efficiently managed fishery and therefore has no incentive to conserve the resource by reducing harvesting effort. Therefore an open access fishery will over time gravitate towards point I, which may be beyond the maximum sustainable yield, point H (Doeringer & Terkla, 1995).

5.   FACTOR   ANALYSIS   OF   ATTITUDES   TOWARDS RESTRUCTURING THE HAKE QUOTA MARKET

Factor analysis was used primarily to identify relationships amongst variables representing various opinions regarding restructuring the hake quota market.

Table 3:   **Loading of factors representative of groups sharing common opinions on restructuring**

Factor	Applicants	Quota holders	Small scale respondents	Larger, longer established quota holders
Eigen Value	3.361	2.771	1.785	1.588
Percentage Correlation Explained	24.0	19.8	12.7	11.3
Auction quota to everyone (0 = Disagree; 1 = Agree)	**0.427**	**0.487**	-0.001	0.159
Grandfathering (0 = Disagree; 1 = Agree)	**0.637**	0.146	-0.301	0.356
Lower initial purchase price, followed by higher annual levies (0 = Disagree; 1 = Agree)	-0.112	-0.354	0.266	**0.625**
Gradual decrease in quota allocation to existing quota holders (0 = Disagree; 1 = Agree)	**0.427**	0.133	**0.443**	**0.502**
Allocate quota to new entrants free of charge (0 = Disagree; 1 = Agree)	**-0.713**	0.366	-0.264	-0.140
Allocate quota to new entrants at a predetermined price (0 = Disagree; 1 = Agree)	**0.454**	**-0.509**	**0.497**	-0.362
Allocate quota to new entrants by means of auction (0 = Disagree; 1 = Agree)	**0.423**	**-0.539**	0.320	0.128
Issuing of 'paper' quota (0 = Disagree; 1 = Agree)	-0.078	**0.655**	0.195	0.160
Regulated quota transfer market for everyone (0 = Disagree; 1 = Agree)	-0.194	0.245	**0.422**	**0.670**
Allow new entrants to lease their quota to other companies (0 = Disagree; 1 = Agree)	0.365	**0.690**	0.343	-0.223
Allow new entrants to lease their quota only to control body (0 = Disagree; 1 = Agree)	**0.478**	**0.506**	**0.538**	-0.003
Fixed tonnage system (0 = Disagree; 1 = Agree)	**-0.768**	-0.239	-0.017	0.288
Labour employed (Number of employees)	**0.495**	0.266	**-0.580**	-0.098
Group membership (Quota holder = 0; Applicant = 1)	**-0.666**	**0.580**	0.223	-0.010

Components that can be meaningfully interpreted lead to a greater understanding of the variation in the data. Factor analysis accomplishes this by replacing the set of existing variables with a new set of variables, defined by a linear combination of the original variables. The factors produced are uncorrelated, ranked in order of decreasing variance and measure different dimensions in the data (Manley, 1994). The percentage of variation accounted for is often rather low in studies of this nature which reflects the complexity of the underlying structure, in the sense that it is not readily summarised (Crabtree, 1971). The technique has also been used in other studies of a similar nature, viz., Nieuwoudt (1977), Steffens (1983) and Stevens (1986).

Fourteen variables representing varying opinions on restructuring were included in the factor analysis. Four factors, having eigen values greater than one, and accounting for 67.9 percent of the variation in the data, were retained. Results of the analysis are presented in Table 3.

The first factor represents a set of respondents, defined as <u>applicants</u>, or those respondents unable to join the industry under present policy. This factor accounted for 24.0 percent of total variation in the data (Table 3) and gave high factor loadings to opinions viewed strongly by these members. Applicants seemed concerned with having to compete with established business for quota, therefore opposing any form of payment for quota. Applicants also opted for a rapid change to a less regulated system of allocating quota, where quota is also allocated as a fixed tonnage as opposed to a proportion of TAC (Table 4).

Table 4:   Applicants attitudes towards aspects of restructuring.

Support:	Oppose:
(1) the free issuing of quota to new entrants (2) a fixed tonnage system of allocation	1) grandfathering 2) allocating quota to new entrants at a predetermined price 3) auctioning quota to everyone 4) auctioning quota to new entrants only 5) a gradual reduction in quota allocation to existing quota holders 6) regulated quota transfer markets

The second factor accounted for 19.8 percent of total variation in the data (Table 3), and assigned high factor loadings to opinions viewed strongly by <u>quota holders</u>. These are respondents who have received quota in the past according to historical performance. They do not wish to see quota reallocated amongst an uncontrollable number of smaller operators who often do not have the resources to efficiently utilise their allocation. Hence the strong support for self-utilisation and the introduction of a form of payment for quota by new entrants,

demonstrated by this group. Opposition to auctioning quota to <u>everyone</u> was expected as these respondents have received quota free of charge in the past (Table 5).

Table 5:   Quota holders= attitudes towards aspects of restructuring

Support:	Oppose:
1) issuing quota to new entrants at a predetermined price 2) auctioning quota to new entrants only 3) the self-utilisation of quota allocation	1) auctioning to everyone 2) the issuing of 'paper' quota

The third factor, representing<u> smaller scale respondents</u>, accounted for 12.7 percent of the total variation in the data (Table 3). This group, comprising of <u>small quota holder and applicants</u>, are unhappy with the present imbalance in the quota market. They wish to see a rapid change to the present allocation structure, where those wishing to obtain quota, either for the first time, or to expand their present size of operation in the case of current quota holders, could do so in an open and free market (Table 6).

Table 6:   Small scale respondents' attitudes towards aspects of restructuring

Oppose:
1) allocating quota to new entrants at a predetermined price 2) a gradual reduction in quota allocation to existing quota holders 3) regulated quota transfer markets

The fourth factor represents<u> larger and longer established quota holders</u>, and accounts for 11.3 percent of the total variation in the data (Table 3). These respondents seemed most concerned with the threat of sudden reductions in quota allocation and proposed methods of payment for quota (Table 7). These companies have been receiving large allocations of quota in the past, and are therefore concerned with the impact restructuring might have on employment and international market share and competitiveness (Table 7).

6   DISCUSSION AND POLICY IMPLICATIONS

Applicants' support for a fixed tonnage system as opposed to a variable or proportional system of allocation may reflect that a minimum threshold quota size exists, below which small operators cannot survive the adverse effects of bad years. Larger, established companies may on the other hand be more

capable of absorbing the potential losses. White Paper intensions to have quota revert back to the State over the specified period of the right, may need further examination as the beneficial effects of a longer period of tenure might be eroded by this practice, hence retarding potential investment in the future productivity of the resource.

Table 7:   Larger and longer established quota holders' attitudes towards aspects of restructuring.

Support:
1) a gradual reduction in quota allocation to existing quota holders
2) free quota transfer market
3) initial purchase price of quota lower, coupled with higher annual levy

Self-utilisation, as already mentioned, has been a prerequisite for allocation under past policy, yet this rule has not been stringently enforced in the past. If quota is grandfathered, then self-utilisation seems the appropriate method, but if quota is auctioned, then there seems to be no reason to impose self-utilisation.

The introduction of a culture of payment for a resource that has been utilised free of charge for so many years is going to be a difficult task. Policy makers may therefore have to find methods to financially assist new entrants as well as current quota holders to purchase quota, and make White Paper proposals of issuing quota according to criteria of both economic empowerment add past performance more clear.

7.   CONCLUSIONS

The hake fishery of South Africa, is characterised by a relatively stable (and even steadily increasing) fish stock due to effective management in recent years. However, due to past political processes, South Africa faces the rather unique situation of having to restructure a fishery that is presently performing well in both biological and economic terms. This study offers some economic solutions to these problems of restructuring.

Analysis of data collected from a postal survey of existing South African hake quota holders and rejected hake quota applicants suggests that distinct differences in opinion exist amongst respondents. Rejected applicants seem concerned with having to compete with established business for quota, opposing any form of payment for quota. Applicants also opted for a rapid change from the status quo to free and open system of allocation, where quota is also allocated as a fixed tonnage as opposed to a proportion of TAC. Current quota holders on the other hand, seem more concerned with issues of self-

utilisation and the effect paying for quota might have on present business operations. Another group of respondents defined as smaller scale respondents (comprising of both quota holders and applicants) demonstrated they were primarily concern with the present imbalance in the industry, where a few large companies receive the majority of quota. These respondents wish to see a rapid redistribution of quota, and a move towards a freer and open quota market. Analysis also revealed a group defined as larger, longer established quota holders who's primary concern seemed to be possible sudden reductions in quota allocation and proposed methods of payment for quota. These companies have been receiving large allocations of quota in the past, and are therefore concerned with the impact restructuring might have on employment and international market share and competitiveness.

It was also calculated that a substantial annual rent of approximately R279 million is generated by the South African hake industry (1997), which is presently harvested free of charge by those issued with quota. It is stated policy of the White Paper to capture these rents, however methods of accomplishing this need to be more clear and comprehensive. Extraction of these rents by the State through auctioning should be considered, while a small amount of quota could be grandfathered to poor communities. The equity issue is however beyond the scope of this study, but recognised to be a very important issue.

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