Renewable Resources in the Pacific
Proceedings of the 12th Pacific Trade and Development Conference, held in Vancouver, Canada, 7–11 September 1981
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The Squid Fishery in New Zealand: the Role of Joint Ventures and Foreign Fleets

C. C. Wallace

Victoria University of Wellington, Wellington, New Zealand

The catching capacity of the New Zealand fishing industry has grown rapidly since the mid-1960s. New Zealand’s declaration of its exclusive economic zone (EEZ) in 1978 forced resource managers in the country to parcel out the fisheries resources among competing claimants: the domestic, joint-venture, and foreign fleets. The squid fishery is one in which there is no domestic capacity; therefore, at present, joint ventures and licenced foreign squid jiggers are operating in New Zealand’s waters. The total contributions of each to the balance of payments of New Zealand have been similar and relatively small, but individual companies have differed dramatically. Export incentives applied by the New Zealand government to the operations of the joint-venture companies dominated their performance results and were highly discriminatory. The policy changes to the basis of the application of these incentives altered results significantly and were well directed. The licenced foreign fleet’s operations contribute more in direct benefits than do joint ventures, but the comparison is exceedingly sensitive to the institutional framework that governs the operations of the joint ventures. The research is still in progress.

Le volume des pêches de la Nouvelle-Zélande s’est rapidement accru depuis le milieu des années 60. Cependant, en 1978, après que le gouvernement eut délimité sa zone économique exclusive, les administrateurs ont été obligés de répartir les ressources halieutiques entre les concurrents intéressés, soit les flottes domestiques, étrangères ou conjointes. Dans le cas de la pêche au calmar, qui n’est pas pratiquée par les Néo-Zélandais, des permis d’exploitation ont été accordés à des propriétaires de cotres, étrangers ou étrangers. Leur contribution totale à la balance des paiements est relativement modeste et a peu près égale alors que celle des entreprises privées accuse des différences considérables. Les stimulants à l’exportation fixés par le gouvernement, qui influent directement sur le rendement, devenaient discriminatoires pour les flottes conjointes. La réorientation de cette politique a contribué à faire évoluer les résultats. Aujourd’hui, les flottes étrangères opérant sous permis, rapportent plus de profits directs que les autres mais la comparaison est établie en fonction du cadre institutionnel qui gouverne les opérations des flottes conjointes. Cette recherche est encore en cours.

Optimism prevailed on 1 April 1978 when New Zealand resource managers assumed responsibility for what was then the fourth largest exclusive economic zone (EEZ) in the world. True, much of the zone was inhospitable, or the sea floor too rough or deep for bottom fishing methods, but the acquisition of the EEZ did seem to offer a stimulus to the development of new fisheries for New Zealanders, especially the deep-sea, migratory pelagic and squid resources.

The resource managers had first to estimate the total resource; though the estimate is now being revised downward, they guessed then at 400,000–600,000 t. Their next task was to allocate the resources between competing claimants — the domestic fleet and the foreign fleet. The domestic fleet has virtually no deep-sea capacity, and few of the vessels have fast-freezing facilities. In contrast, the foreign fleet was well equipped. It consisted of Japanese, Koreans, Taiwanese, and Soviets who had, over the preceding 7 or 8 years, fished in the area during their home off-seasons. The compromise arrangement of the joint venture, with equity and, possibly, activities being shared between New Zealanders and foreign partners was also an option, both a compromise and, possibly, a tool of development.

High fish prices in 1978, caused by the efforts of distant-water nations to stockpile fish supplies against uncertain future access in EEZs, contrib-
uted to New Zealanders' optimism. Some saw the joint ventures as a shortcut to development of the domestic industry, foreign partners supplying skills, technology, capital, equipment, knowledge of the resource, and markets in exchange for access to the resources.

Another view of the joint-venture arrangements was that they could be a method of obtaining for the New Zealand partner and nation quick access to extra income in much-needed foreign exchange. Others thought the joint ventures would have a neutral impact on the industry's development, simply reserving the resource for the domestic fleet to "grow into."

A fourth and less enthusiastic view often held by domestic operators was that the joint ventures were simply a back-door method used by foreigners to avoid licence fees and that, worse still, they could be expected to preempt the New Zealand catch on foreign markets or even local markets. By overfishing, the joint ventures could actually inhibit the development of the domestic fishing industry.

It was further asserted — although without substantiation — that the taxation and incentive system was such that New Zealand was actually "paying the foreigners to take the fish away."

For me, the debate generated a whole series of questions:
- Why, with its long coastline, early history of sea-mammal hunting, and pre-European Maori economy in which fish was important, had New Zealand's fishing industry been so slow to develop?
- If there were development blocks, what were they? Had they disappeared? Would either joint ventures or the licenced fleet option remove those that remained?
- Would the presence of joint ventures inhibit the development of the domestic fleet?
- Could the domestic fleet be expected to "grow into" the resource?
- Were the joint ventures helping or damaging the balance of payments?

I found a consumer's choice of explanations for retarded development although none has been rigorously tested: restrictive measures imposed by successive New Zealand governments to protect the resource or those exploiting it, capital-market imperfections; inefficiencies caused by oligopsonies; cultural inadequacies; and lack of knowledge of the resource.

There are too many questions, and too many competing answers, for one paper: they will be examined later in the research program. In this paper, I examine in the context of the squid resources the scope for domestic expansion into squid fishing, and I compare the immediate impacts of the joint venture and licenced fleets on national income and the balance of payments.

The New Zealand Fishing Industry

The New Zealand fishing industry encompasses coastal pelagic and demersal resources; rock lobster; shellfish such as oysters, scallops, paua (abalone), and mussels; freshwater resources are mainly managed for recreation and tourism, although the export of live eels is important.

The fishing fleet has many part-timers; vessels operating full time in 1980 probably numbered around 1500, employing some 2900 crew (New Zealand Fishing Industry Board estimate). Few of the vessels are longer than 27 m, and most lack deep-freezing capacity.

Owner operators concentrate in the high-value fisheries, such as rock lobster and whole, chilled snapper for export. The larger companies tend to dominate the large-volume, low-value fisheries.

In 1980, about 87 000 t of finfish, 4000 t of rock lobster, and 18 000 t of shellfish (including small quantities of squid) were caught by the domestic fleet. Finfish accounted for 59% of landed value, rock lobster 29%.

The industry had stagnated at 20 000–25 000 t of finfish during the 1950s, but there was a take-off in the mid-1960s. Growth during the 1970s was rapid, although greatly exaggerated in later years by the original statistics that frequently included figures relating to joint ventures. Japan and Australia are major markets; the USA absorbs high-volume shellfish and rock lobster.

Squid

New Zealand's interest in developing the squid fishery was stimulated by the appearance of Japanese vessels — some of them converted tuna boats — fishing for squid off the New Zealand coast. In the 1970–71 season, eight Japanese vessels were observed squid fishing, and the Japanese Fishery Agency research vessel was recorded as having returned for a second catch.

Records are incomplete, but, in a report to the government (unpublished 1975), a New Zealand fishing firm recorded that in the 1972–73 season, 69 Japanese vessels landed squid at an average of 3.9 t/fishing day (rather high by recent standards). Successive New Zealand Fishing Industry Board reports have recorded increasing total squid catches by the Japanese from New Zealand waters.
By 1977, both the Soviets and the Japanese had increased their fleets, landing a total squid catch from New Zealand waters of about 83,500 t. New Zealanders caught only about 500 t. Of the foreign total, just over two-thirds was taken by trawling (28,500 t by the Soviets, 20,000 t by Japan, and 8,500 t by Korea). Japan took a further 24,500 t by jigging and Taiwan about 1,800 t.1

Since the introduction of the EEZ and of foreign-fleet licencing arrangements, the Japan Squid Anglers' Association has acted as an intermediary for Japanese vessels. Owners send vessels to New Zealand under the auspices of matchmaking companies.

The affairs of the vessels are usually looked after in New Zealand by a port agent who, for a fee, handles the arrangements necessary to secure customs' clearances and formalities, harbour board services, medical and dental treatment for the crew, repatriations, repairs, surveys, and sundry other services. Such agents also handle onshore arrangements for some joint-venture vessels.

The Nature of the Resource

At least 70 species of squid have been identified in New Zealand waters, but arrow squid (Noto-darus sloani) is by far the most important commercial species, well-liked by Japanese consumers. Squid are cephalopods, part of the mollusc family.

Most of New Zealand's knowledge of its squid resource has come from foreign fishing and research activity, especially that of the Japanese. New Zealand scientists have only recently begun to research the squid resource. They still lack an understanding of its distribution, migratory patterns, life cycle, position in the food chain, and population size and dynamics. Squid occur in areas rich in species upon which they feed: saury, fingerling fish, krill (small crustaceans), and small squid. These areas tend to be where ocean currents converge and bring nutrients from the ocean floor into the zone where light penetrates and allows photoplankton to grow.

Squid are thought to migrate in swarms from around New Zealand to warmer waters for spawning. Evidence suggests that a series of swarms, more or less independent of each other, move at different times, at intervals, along several migration paths. Scientists believe that the squid live for about 12 months, growing rapidly during migration. When the mantle — or body — is 20–35 cm long, the squid are mature. They spawn and apparently die soon afterward, although no large concentrations of dead squid have been found. An enormous loss through natural mortality has been recorded. In one major New Zealand fishing ground, Korean squid-trawling figures for 1978 suggest natural death and migration accounted for a loss by August of 83% of the July stock (Roberts 1978).

Squid occupy an important position in the food chain. As well as being predators of many species, they are preyed on by sea mammals, tuna, and other fish. Squid stocks can be expected to fluctuate considerably from year to year (according to environmental conditions). Stocks are thought to recover quickly because the squid are short-lived.

The jig fishery is concentrated in 40–250 m deep water. Early estimates, based on random samples of foreign-trawling catches with allowances for escape, placed total standing stock of squid at 300,000 t (Roberts 1978), but scientists now consider this estimate to have been too high.

Squid fits the vent-for-surplus model. The domestic market is limited to a small demand for food and anglers' bait. The main limitation on the domestic market apart from the size of the population is consumer preference.

How far squid is a surplus that can be vented is also a biologic question. If this year's crop of squid is not used, is it wasted? Where in the rest of the food chain does it go? Uncnaged squid serve an economic function if they eat the predators of commercial species or are a food source for commercial species.

Problems of Domestic Industry Development

So far, squid fishing is seasonal, with foreign vessels moving into New Zealand's waters during their own off-season. Since 1972–73, the Japanese (and for a while the Taiwanese) jig fleets have arrived in mid-December and left in early to mid-April, although the New Zealand season is now thought to extend from at least November to June–July. New Zealand trawling data suggest year-round presence, but, until a year-round fishery is identified, the New Zealand squid-fishing industry would need off-season employment of crew and capital to be viable. For the foreigners and joint ventures, this complementarity is provided by their domestic season for squid.

Possible options for a New Zealand fleet include:

- Specialized jig boats that pursue squid year-round, either in New Zealand waters or in foreign waters under reciprocal agreement; and

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1Unless otherwise specified, the information in this section comes from successive annual reports of the New Zealand Fishing Industry Board, Government Printer, Wellington.
• Dual or multipurpose boats that can fish for squid and other species with a complementary season.

Unless the fishery is close to onshore facilities for freezing the catch to an unvarying -50°C within a short time, a primary requirement for squid boats would be this freezing capacity. Stability — and, hence, trawl boats — is also necessary for inclement weather, although boats fishing only in summer and close to shore would be relatively free from this constraint.

**Complementary-Season Fisheries**

If the New Zealand squid season is about November–June, then the seasons for bluefin tuna, oyster, and snapper complement it. The oyster season is 1 March–31 August, but entry to this fishery is already limited. Squid jigging with finfish longlining in the off-season has been tried by a Korean–New Zealand joint venture, but so far results are not encouraging. The bluefin tuna season is May–October (at least that is when the Japanese operate in New Zealand waters). Both squid and bluefin tuna require quick freezing and, in that sense, are technically suited to combination. Tuna boats, however, are usually slim, with a cutaway side for brining the big fish. Lack of stability is thus a problem for their use in squid fishing.

Jigging is a line-poling technique that became mechanized in the early 1970s so that one person can operate several lines. The machines are mounted along each side of the deck, with lines being paid out and then reeled in over elliptical drums. Bright lights are usually used to attract the squid to lures, although off-season trials by New Zealanders working close to shore have given good results in daylight.

Trawling is the major alternative to jigging and is so far the only technology that is suitable to rough seas where the motion of the boat and the tangling of the lines preclude jigging. The drawback of trawling is damage to the squid. Purse-seining or other forms of aimed net fishing have not been shown to be viable, because the New Zealand arrow squid probably does not concentrate for spawning as densely as other species of squid.

Net fishing, including trawling, has the disadvantage of being nonspecific so that mesh sizes fine enough to catch squid tend to be ruled out by the requirement of protecting the young of other commercial species. Most of the current squid-trawling operations (mainly Soviet and Japanese) are restricted to the rough southern waters for this reason.

With the introduction of the exclusive economic zones around the world, many distant-water fleets have considerable excess capacity, and vessels may be available for the market — a source for increasing New Zealand's fleet capacity.

**Squid Joint Ventures**

The 1978–79 squid season was the first after the declaration of New Zealand's EEZ took effect. In that year, 12 joint-venture companies were given approval to operate, a total 71 squid-jigging vessels (of which 59 actually arrived and operated in the zone). The vessels came from Japan, Korea, and Taiwan.

The 1979–80 season saw approvals given for 108 vessels under charter to 18 companies to be operated in the EEZ, but only 82 actually operated. Together, they caught a total 15,381 t, according to company records.

Joint-venture companies were set up between New Zealanders and foreigners by means of a shared equity company and a charter arrangement whereby partners assumed various responsibilities: a charter fee was paid to the foreign partner (or, where a matchmaking company participated, to a third party), which supplied vessels and crew. Arrangements for the provision of supplies, fuel, onshore and marketing services varied. Risk-taking by the local partner ranged from full catching and marketing risk, with vessels being hired on a contract basis, to a fee that depended on catch volume or on the eventual sale-value of the catch.

The New Zealand government vetted arrangements, insisting on copies of charter and other documents and financial accounts of operations at the close of each season, as a condition of approval. These data were the basis for my study of the joint-ventures' contributions to the national economy and the balance of payments, in particular. The cooperation of the companies is greatly valued.

The study is still in progress; at this time, the results are preliminary and do not deal with multiplied effects or opportunity costs. The flows treated are current flows: capital has been left aside. The development issues of the transfer of skills and technology, market pioneering, or the generation of backward and forward links have not been addressed. Thus, the features of joint-venture arrangements that make for good or bad performance from a national-interest point of view have not been identified, although the relative effects of the existing export-incentive schemes are clear.
Method and Terms of Assessment

A host country (such as New Zealand) considering the immediate effects of private direct foreign investment, such as a joint fishing venture, would chiefly be concerned with what it gets from the operation. National income, rather than domestic income, is the key to my analysis. Whereas gross domestic product, or income (GDP or GDY), is the sum of value added by each industry in the economy, gross national product or income (GNP or GNY) is GDP minus the net remittances to foreign factors of production abroad.

Gross national income is the sum of all incomes accruing to domestic nationals. This includes wages and salaries; rents to resources and facilities; net income to government; profits, interest charges, and other payments to capital. Transfer payments between New Zealand nationals are excluded and net payments to foreign factors of production are deducted.

I have calculated the balance-of-payments impact, or returned value to New Zealand, in two stages. First, I found the net effect on foreign exchange earned (revenue less all direct outgoings of foreign exchange); then I adjusted this figure for leaks abroad in the form of the import content of the goods and services purchased locally. (Details of methods and assigned import contents could not be included here for reasons of space, but I will be pleased to provide them on request.)

For the joint-venture approach to be worthwhile to the host country, it should compare favourably with a total New Zealand enterprise on one hand and the flows generated by licenced foreign vessels on the other. Although returned-value and value-added generated by joint ventures and the licenced foreign fleet are considered here, the domestic industry does not yet exist, so no consideration is given to this alternative.

A balance-of-payments approach, rather than an overseas-exchange transaction (OET) approach, is used. In other words, all profits to which a foreign partner has claim have been subtracted from New Zealand's foreign exchange, and, similarly, all funds to which New Zealand has claim have been added.

Export incentives

One of the policy objectives of government has been to promote exports, one method being taxpayer subsidies for exports. During the period studied, two sets of rules on incentives applied, referred to here as the old rules and the new rules. The latter were phased in during 1980. The old rules provided a tax credit or payment on the basis of a percentage of FOB export receipts. The new rules provide rewards for the domestic value-added of exports. For the 1979-80 season, I made calculations of the export incentive for each company based both on the old and on the new rules so that the impact of the two export incentive schemes could be compared. Probably all ventures were in fact rewarded for exports according to the "old rules."

Implicit foreign-exchange premia

The returned-value (adjusted for leaks abroad) to New Zealand of a venture's operations, when related to the size of the export incentive, provides an indication of how much taxpayers paid for foreign exchange, or how much taxpayers paid to the joint venture to secure export dollars. In the study, I looked at two measures of taxpayer subsidy — net (export incentive less tax) and gross (export incentive alone). The latter, divided by returned-value, is probably the best measure of the implicit premium on foreign exchange because it measures what the taxpayer pays out to secure national income in foreign exchange rather than in New Zealand dollars. This is not an exchange transaction but a direct subsidy from the taxpayer to the joint-venture company. For example, the gross figure may be 0.70. This indicates that New Zealand taxpayers paid $0.70 to the joint-venture partners for every $1 of returned-value. The net figure is sometimes negative. This is caused either because the returned-value was negative (foreign exchange drained away) or because taxation exceeded export-incentive payments.

I added wages, rents, return to capital and entrepreneurship, and net payments to get incomes to factors of production directly employed by the venture. Returned-value is this amount plus the local content of locally purchased goods and services in the venture. Viewed another way, it represents that part of the export receipts that ends up in New Zealand after all foreign-exchange leaks have been accounted for. The measure of value added directly by the firm can be viewed as the direct gain to New Zealand national income if the domestic factors employed by the company would otherwise have been idle, that is, if there were no opportunity costs.

Comparison between values added by individual ventures is difficult because of the considerable differences in the way in which joint-venture companies arranged and reported their affairs in their accounts. For example, some joint-venture companies hired New Zealand companies to perform various services for them. Sometimes, the company hired was one of the New Zealand
partners in the joint venture. Thus, comparisons of interfirm performance are made on the basis of returned-value, corrected for foreign exchange leaks, rather than on the basis of value-added.

The study material
The study covers the accounts for the operations of 10 joint-venture companies operating in the 1978–79 squid-jigging season and 13 companies in the 1979–80 season. The majority of vessels were Japanese, but some were Korean and Taiwanese.

The 1978–79 figures exclude the results of one company that went out of operation early. The results of another company that operated in the 1978–79 season but not the following season have been included in the aggregate results but excluded from the presentation of the individual results because of the need to maintain confidentiality.

Caveats
The figures on costs, charter fees, and prices have all been taken at face value and have not been independently checked, although queries to companies sometimes elicited revised figures that were adopted for the study. Some caution should be exercised in accepting the final figures. The existence of export-incentive payouts provides a clear reason for companies to inflate export revenue or, in the case of the new rules, to boost local spending. Various controls and levies on imports to markets also provided incentives to manipulate figures.

One company, D, noted on its 1978–79 return that the price it received was U.S.$1550/t CIF “But...the letter of credit was established at $1050/tonne.” There is an obvious local corollary to this kind of practice.

The Results
The aggregated performance results (Table 1) of all the squid-jig joint ventures in 1978–79 and in 1979–80 disguise a wide difference between individual companies.

In 1978–79, the gross value of joint-venture squid exports stood at $12.2 million, of which the returned value to New Zealand was $1.6 million ($0.4 million of value being added directly by the companies), and the export incentive was $1.3 million. The New Zealand taxpayer, thus, paid a subsidy of $0.79 on average for every $1 of foreign exchange. Thirteen percent of the value of exports returned to New Zealand. For every tonne of squid caught, $218 returned to New Zealand but $172 in export incentive was paid to the joint-venture companies. The companies paid out, as direct income to factors of production that they hired themselves, 3% of their total export receipts. Among individual companies, returned-value ranged from −$1173/t to a high of $356/t (but both of these results are somewhat suspect). The next two extremes were $34/t and $306/t.

Value added nationally also varied significantly and was negative in 4 of 10 cases. The highest figure for value added nationally was $169/t. The range in implicit foreign exchange premia was very wide. One company was paid $0.13 for every dollar of foreign exchange that it drained away. Another company received $3.75 for every dollar of foreign exchange it brought in, and three other companies received payments in the $0.40–0.50/$1 range.

Export incentives per tonne caught varied but less dramatically and were within $100–200/t. The average was $172/t. The export incentives made a difference to the profitability of the joint ventures, 4 of 10 ventures recording losses before taxes and 2 reporting profit levels at 0–5% of export receipts.

In 1979–80, a gross $20.9 million in export receipts was recorded from a squid catch of 15424 t. Under the old export-incentive rules, about $2.9 million would have been returned to

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<tr>
<td></td>
<td>old rules</td>
<td></td>
<td>new rules</td>
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<tr>
<td>Exports ($1000)</td>
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<td>20868</td>
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<tr>
<td>Net returned value ($1000)</td>
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<td>2883</td>
<td>3279</td>
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<td>Value added nationally ($1000)</td>
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<td>991</td>
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<tr>
<td>Net taxpayer subsidy ($1000)</td>
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<td>237</td>
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<tr>
<td>Export incentive ($1000)</td>
<td>1279</td>
<td>2311</td>
<td>532</td>
</tr>
<tr>
<td>Catch (t)</td>
<td>7445</td>
<td>15423</td>
<td>15423</td>
</tr>
<tr>
<td>Returned value per tonne caught ($)</td>
<td>218</td>
<td>187</td>
<td>213</td>
</tr>
<tr>
<td>Value added nationally per tonne caught ($)</td>
<td>56</td>
<td>64</td>
<td>90</td>
</tr>
<tr>
<td>Export incentive per tonne caught ($)</td>
<td>172</td>
<td>150</td>
<td>35</td>
</tr>
</tbody>
</table>
New Zealand, compared with $3.3 million under the new rules (Tables 2 and 3). The former, based on total export receipts, averaged $150/t, whereas the latter, paid out on the basis of domestic value-added, averaged $35/t. The difference in payout per dollar of foreign exchange earned was dramatic — under the old rules $0.76 was paid on average, whereas under the new rules, the subsidy would have been only $0.16/$1. In 1979-80, no returned-value was negative, although value added nationally was negative in 5 of 12 cases. Under the new rules, returned-value and value-added would both have been generally higher, the latter being negative in only two cases. Under the old rules, the implicit foreign exchange premia, or export-incentive payments, ranged from $0.18 to $2.98/$1 of foreign exchange earned.

The overvaluation of the New Zealand dollar (20% commonly regarded as being a realistic estimate of the implicit shadow exchange rate premium) indicates that New Zealand would be behaving rationally in providing a subsidy of up to $0.20/$1 of foreign exchange if the balance of payments were the criterion.

Under the new rules, the payout to all but 1 of the 13 companies was within this "rational" range, but, under the old rules, only 1 company was paid at a rational level, and 10 were paid at more than three times this amount.

### Licenced Foreign Vessels

In the 1979-80 season, 102 vessels were licenced to jig squid, 98 of them Japanese, the others Korean. The licence fees were $14250/vessel plus $95/t for every tonne over 150 caught. Licence fees totaled $2.5 million. Accounts for 29 of the vessels (all Japanese and operating during 1979-80) were available, and I used these to derive figures for returned-value for both seasons.

The accounts covered all port calls and recorded provisions, cash advances, maintenance, air fares, and hotels for crew leaving the vessel, medical fees, and other charges such as harbour board, port agency fees, and sundries. Purchases listed in the accounts as provisions were separated into categories and calculated as a

<table>
<thead>
<tr>
<th>Company</th>
<th>Net returned value as % of X</th>
<th>Value added nationally as % of X</th>
<th>Net profit to venture before tax and incentives</th>
<th>Net profit to venture after tax and incentives</th>
<th>Net profit to NZ partner after tax and incentives</th>
<th>Value added nationally per tonne caught ($)</th>
<th>Export incentive per tonne caught ($)</th>
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1The results of company 1, which in 1978-79 showed the highest figure of returned value per tonne of squid caught should not be taken at face value. The company did not supply figures for its accounts in the standard form requested and instead presented the figures for both squid seasons and other fishing operations in consolidated form. The figures have been un­tangled as far as possible but staff changes in the company and uncertainty over the eventual size of the catch has left unsolved problems. Lack of certainty that surrounds both the accounts and the catch makes the distribution of returned-value, value-added, and tonnage between seasons suspect.

2The results of company K in 1979-80 were suspect for several reasons: its average price per tonne was, at $1881, much higher than that of any other company in the season; the charter arrangement it had with the foreign owner of the vessels gave K a fixed fee that did not vary with the catch or its value; and, like other companies, it stood to gain a great deal through export-incentive payments.

Table 2. Performances by individual joint-venture companies under old rules for export incentives, 1979-80.
Table 3. Individual performances by joint-venture companies if new rules on incentives had applied, 1979–80.

<table>
<thead>
<tr>
<th>Company</th>
<th>Net returned value as % of X</th>
<th>Value added nationally as % of X</th>
<th>Net profit to venture before tax and incentives</th>
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</tbody>
</table>

The profit or loss as % of X represents a percentage of the aggregate budget. The import content of the categories was then estimated.

The procedure carries the implicit assumption that the 29 vessels whose records were available were representative of the rest of the fleet. There is no check on this, but the size of the group — about one-third of the fleet — makes it unlikely to be highly inaccurate.

For the 1979–80 season, I arrived at a figure of $4.4 million for value returned by the 102 vessels. The Japanese had caught 25 150 t, the Koreans 403 t. Licence fees averaged $24 141/vessel, or $94.36/t of squid. The average returned-value stood at $43 437/vessel or $251/t.

The accounts for the 1978–79 season were not available so the 1979–80 figures were used, with adjustments for changes.

In 1978–79, 117 vessels from Japan and Korea were approved, and those that came caught a total of 18 471 t of squid. Allocations were made on a quota basis, and in this year fees were levied on the basis of a flat fee, $80/t allocated. Japan’s quota was 29 000 t, Korea’s 1000 t. Actual catch (18 471 t) was well short of the total 30 000 t allocated. The full amount of $2.4 million of licence fees was collected. The net result of the calculations was a figure of $4.1 million in returned-value. This gives an average returned-value per vessel of $35 043 or $222/t. The licence fee averaged $130/t caught.

**Comparison**

New Zealand government officials allow vessel entry on the basis of an expected season’s catch of 220 t/vessel. In the 1978–79 season, 71 joint-venture vessels were approved, reflecting an implicit allocation of 15 620 t. Fifty-nine joint-venture vessels actually operated, and company records give a total catch of 7352 t. In the 1979–80 season, only 82 of the 108 joint-venture vessels approved actually operated, catching a total of 15 381 t. The allocation to joint ventures was 23 760 t. The foreign fleet in 1979–80 was allocated 115 vessels, or a total allocation of 23 760 t.

The shortfall in joint-venture vessels reflects the fact that some partners were either unwilling or unable to complete the charter of foreign vessels. The inability of a few joint-venture companies to secure all the vessels for which they had approval heavily influenced the joint-venture record on the basis of allocation.

**Comparative Catch Rates**

Analyses by Roberts of the squid catch rates of foreign and joint-venture vessels fishing in the New Zealand EEZ during 1978–79 (Roberts unpublished) revealed that, at 161 t, the average catch per vessel of the licensed Japanese fleet was considerably higher than the joint-venture vessel average of 125 t.

Roberts’ work also revealed that the Japanese vessels of all sizes consistently outfished Korean and Taiwanese counterparts on the basis of catch per vessel-day. He attributed this difference mainly to greater length of fishing experience of the Japanese in the waters around New Zealand.

The difference in average catch by the foreign and joint-venture fleets has been attributed by New Zealand officials to the presence of Korean
and Taiwanese vessels in the joint-venture fleet; to the most experienced crew and skippers being attracted to the licenced fleet; and to the licenced fleet vessels being on the whole newer and better equipped than those of the joint ventures. Roberts reported that foreign vessels and joint-venture vessels stayed in the EEZ for about the same length of time and fished for about the same proportion of that time.

**Returned-Value**

The returned-value per tonne caught and per tonne allocated of the joint ventures was virtually the same as that of the licenced foreign fleet in 1978-79 on the basis of actual catch, although the foreign fleet returned about 30% more on the basis of allocation (Table 4).

The 59 joint-venture vessels that fished for squid returned $1.6 million in foreign exchange to New Zealand in 1978-79, 13% of the total export receipts earned by the squid joint ventures. The figure for 82 vessels in 1979-80 was $2.9 million (or $3.3 million if the new rules on export incentives were applied). This constituted 14–16% of export receipts.

In contrast, the licenced foreign fleet of 117 vessels approved in 1978-79 contributed $4.1 million. In 1979-80, 102 foreign vessels returned $4.4 million in foreign exchange to New Zealand. In 1978-79, there was little difference between results from the foreign and joint-venture fleets. In 1979-80, the change in the export-incentive rules improved the returns to New Zealand of the joint-venture fleet, but a change in the licencing fees improved the returns from the licenced fleet and gave relatively better results than the change for joint ventures.

The range of performance by individual joint-venture companies, both in terms of their profitability and their contribution to national economy, was wide, conforming to the pattern noted by Lall and Streeten (1977) in their studies of private direct foreign investment in manufacturing.

<table>
<thead>
<tr>
<th>Table 4. Comparison of returned values from joint ventures and the licenced foreign fleets.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Per tonne caught</strong></td>
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<tr>
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<td><strong>Per tonne allocated</strong></td>
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<tr>
<td>Joint venture</td>
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<tr>
<td>Foreign</td>
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</table>

The influence that overwhelmed that of the institutional arrangement was the highly discriminatory export-incentive payments and the manner of levy of the licence fees on the foreign fleet. The export-incentive payments arrangements under the "old rules" were irrational and inequitable as they rewarded earners of foreign exchange very differently for their contributions to the balance of payments and even paid for the draining away of foreign exchange.

Changes to the incentive scheme have been made and have improved returns to New Zealand. The payments under the new rules can be regarded as generally sensible, so that government policy has moved appropriately. Even with the new rules, however, rewards are unevenly bestowed.

Shadow prices and opportunity costs have not been built into the study, but the major distortions to prices and returns caused by inappropriate institutional arrangements that stem from government policy are particularly clear. In this context, calculation of the real social cost-benefit of alternative options is extremely difficult. The role of different institutional arrangements in overcoming possible development blocks — if these can be identified — and the identification of any tendencies toward systematic development inhibitors are subjects for continuing research.

__Particular thanks are owed Dr Geoffrey Bertram of Victoria University of Wellington, on whose methodology this study is based, and Dr Peter Bushnell, head of the Research Section of the Economics Division of the Ministry of Agriculture and Fisheries, New Zealand. Both have given much advice and help. Thanks are also due the numerous individuals in the Fisheries Management, Fisheries Research and Economics Division of the Ministry of Agriculture and Fisheries, New Zealand. Dr Peter Roberts and Peter Riley have been especially helpful. Any errors are mine and the views represented here do not constitute official New Zealand government policies. The work is in progress as part of a PhD thesis with Victoria University of Wellington and this section was completed under contract for the Ministry of Agriculture and Fisheries, New Zealand, whose assistance is gratefully acknowledged. Most of the aggregate figures concerning the fishing industry as a whole were compiled by the New Zealand Fishing Industry Board; the information supplied concerning squid came from Dr Peter Roberts of the Ministry of Agriculture and Fisheries, whereas I obtained the information on the companies and the foreign fleet while working under contract with the Ministry of Agriculture and Fisheries. The cooperation of the companies is also gratefully acknowledged."

The raw data for the study are confidential, and the results of this study have been presented in a form that
does not disclose the identity of the firms. Individual results are interesting for their range, so these have been written up as ratios, percentages, and rankings. Absolute figures have been avoided, except as aggregates, so that the results cannot be reconstructed to identify individual firms.