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Consumption of Scallops in Japanese Households

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Abstract

Recently the production of scallops has increased and yield has reached nearly 0.4 million tons. On the other hand, the decline in the price of scallops seems to be a difficult problem for those who product scallops. Although the price is determined by both supply and demand. Until now the study of the demand for scallops has been superficial.

The purpose of this paper is to investigate the characteristics of the consumption of scallops in Japanese households. Most of the data used in this paper was obtained from the 'Annual Report on the Family Income and Expenditure Survey' by the Statistics Bureau Management and Coordination Agency.

In this paper we make the following conclusions:

(1) Since the price elasticity of scallops in household consumption is relatively great, the decline of the price has caused an expansion of the consumption.

(2) Although the quantity of scallops consumed has increased, the difference between districts is still large. The quantities consumed in Hokkaido and Tohoku are larger than those in the other districs.

(3) The consumption of scallops will increase in the future, because the demand has been expanding in all districts.

Introduction

This paper attempts to demonstrate the characteristics of scallops consumption in Japanese households.

In Hokkaido, scallops are one of the most important marine products. Especially after the shrinking of the northern-sea fisheries, the economic importance of scallops farming and the scallops fishery have increased more and more. Recently scallop production has reached nearly 400,000 t. However, as output of this industry becomes greater, the decline of its price is becoming a difficult problem for fisherman (see Fig. 1).

Naturally the price of goods depends upon not only the supply but also the demand. They say that a market for scallops has been saturated. Is that true ? If the market has been saturated, we cannot expect an expansion of the scallops industry and it is impossible to keep the current price level without controlling the production. But it is also difficult to control the output in the industry in which many producers exist. However, if further growth of the market for scallops is to occur, the most important strategy is to cause an in crease in the demand.

The market and distribution of scallops in Japan were reported by Sakai (1984). Sakai demonstrated the structure of the scallop market. Although this report provides much information, some of information has become outdated since the

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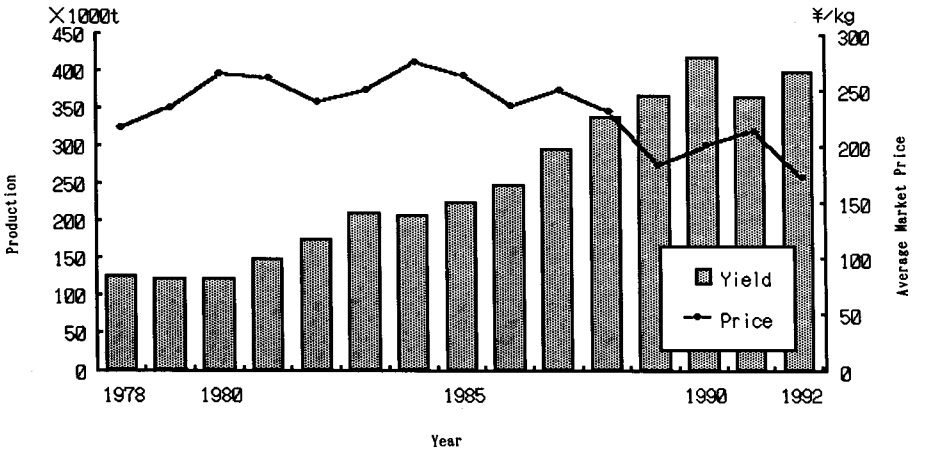

Fig. 1. Production of scallops and average market price (1978-1992).
Source : Annual Fishery Production Statistic of Japan.

industry has largely changed since the writing of his report. Since data for his research were obtained from statistics of some central wholesale markets, he didn't research consumption of scallops in households ('Annual Report Family Income and Expenditure Survey' by Statistics Bureau Management and Coordination Agency has followed scallops after 1982). Taya (1991) analyzed consumption of marine products by statistical methods and scallops were included in this research. But the primary concern of his research was the surplus of aquaculture products and the resultant decline in price for the producers. Thus this report didn't deal with scallops consumption in households.

There has been some research on the scallops industry. Most of the studies were concerned with historical analysis or with systems used in the field (Shima, 1981 ; Miyazawa, 1981 ; Sakai, 1981, 1987, 1992).

Scallops are sold as various products ; some are highly processed, while others are sold with shells as fresh shellfish. They are also consumed in various manners. Some people may consume them with their families, while others may consume them in restaurants or at parties. Here we will limit our discussion to scallops consumption in family honseholds.

We can find available data in the 'Annual Report Family Income and Expenditure Survey'. All data for paper were obtained from this survey. In the survey, scallops were classified as 'fresh fish & shellfish'. Because, in fact, fresh fish consist of both fresh and frozen fish, the sum of both fresh scallops and frozen fish is used in the survey. However, because processed scallops are mixed to 'salted & dried fish' or 'other processed fish', we cannot differentiate them from those items. This means that we cannot deal with the entire scallops in households in this paper.

Consumption of fresh fish and shellfish

Fig. 2 shows the trend of both living expenditures and food expenditures per household. Both values are deflated by the consumer price index (excluding

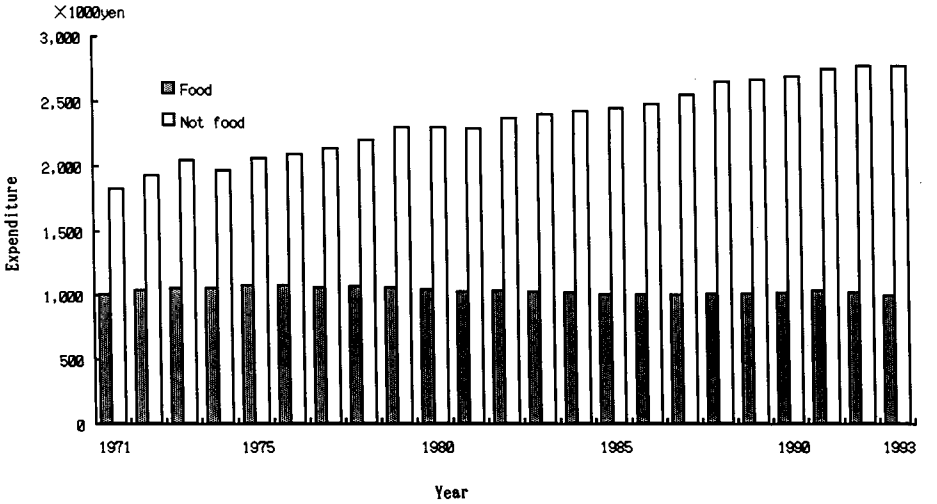

Fig. 2. Mean yearly household expenditure for food and non-food items (1971-1993).
Source: Annual Report on the Family Income and Enpenditure Survey.

imputed rent, 1990=100) in order to exclude the impact of inflation. Food expenditures have increased a little, while living expenditures have been increasing in the long run. This means that the increase in actual income has contributed little to food expenditures. It must be noted that food expenditures have been constant, because the scallops market is a part of the food market.

The quantity of fresh fish & shellfish consumed is shown in Fig. 3. It has been decreasing in the long run. Consumption in 1993 was only 82.2% of the 1970

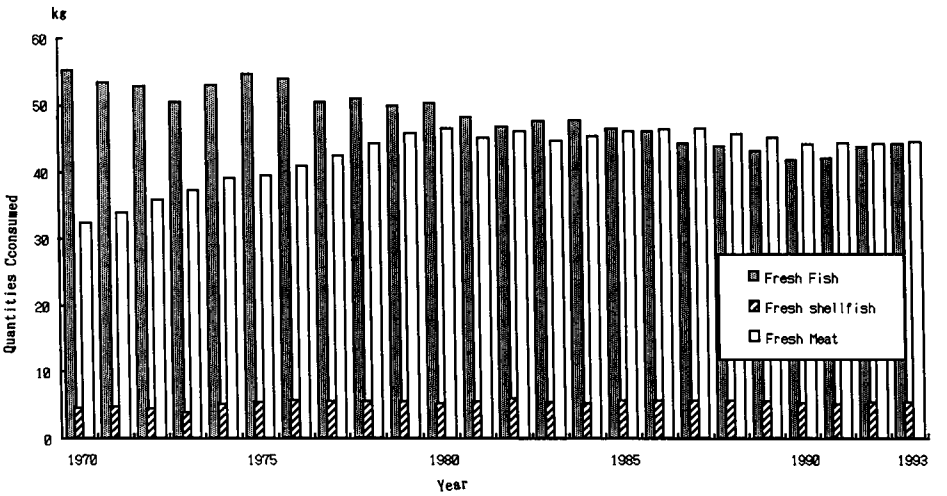

Fig. 3. Mean household consumption of fresh fish & shellfish and fresh meat per year (1970-1993).
Source: Annual Report on the Family Income and Expenditure Survey.

quantity consumed. However, although fresh shellfish belongs to fresh fish & shellfish, consumption of shellfish has been increasing. Consumption of fresh in 1993 was only 79.3% of the 1970 quantity consumed, but the consumption of fresh shellfish was 116.5% of that in 1970.

Most people would accept that meat competes with marine products in the food market and that an increase in consumption of beef, pork and chicken has caused a decrease in consumption of marine products. In fact, chicken, mixed ground meat and other fresh fish in the 'Annual Report on the Family Income and Expenditure Survey', increased while the consumption fresh fish & shellfish consumption decreased. This may indicates that the increase in meat consumption caused the decrease in marine products consumption. Although, however, fresh meat consumption has not been increasing after the 1980's, the quantity consumed of fresh fish & shellfish still has been decreasing.

Assuming that the quantity consumed of fresh & fish shellfish is explained by the price of itself and price of meat, and that their elasticity coefficients are constant, the consumption of fresh fish & shellfish is established using the following equation. In this equation, 'log (x)' expresses the logarithm of x to the base e. Data for model were obtained from monthly data collected from January, 1987, through December, 1992.

$$\log(\mathrm{FIQUAN}) = 8.462 - 0.703 \log(\mathrm{FIREP}) + 0.648 \log(\mathrm{MEREP}) + 0.355\mathrm{DUMDEC}$$

(t-value) (12.063) (4.190) (2.902) (11.351)

$R^2 = 0.655$

DW (Durbin–Watson test statistic) = 1.221

where; FIREP = real price of fresh fish & shellfish (yen/100 g),
FIQUEN = quality consumed of fresh fish & shellfish (g),
MEREP = real price of fresh meat (yen/100 g),
DUMDEC = dummy variable which explains the special demand in December (December = 1, other months = 0).

Parameters obtained from this model are significant at the 1% level. According to the above equation, the price elasticity coefficient is 0.703. Since this value is smaller than 1, we can regard fresh fish & shellfish as "rigid" goods. The cross price elasticity for fresh meat is 0.648 (the consumption of fresh fish & shellfish increases by 0.648% for each 1% rise in fresh meat price). The cross elasticity is not at a high level, but we should not ignore it. After the liberalization of beef imports into Japan, the price of beef has recently declined. Thus, although the cross elasticity in not at a high level, the impact of an expansion of the consumption of beef on the demand for marine products may be strong.

Consumption of Scallops in Households

The 'Annual Report on the Family Income and Expenditure Survey' has listed scallops only after 1987. The consumption of scallops by households might have been small before the 1980's. Fig. 4 illustrates the trend in the quantity of scallops consumed per household. And Fig. 5 illustrates the price and the expenditure for scallops. The consumption of scallops has increased for the last two years because

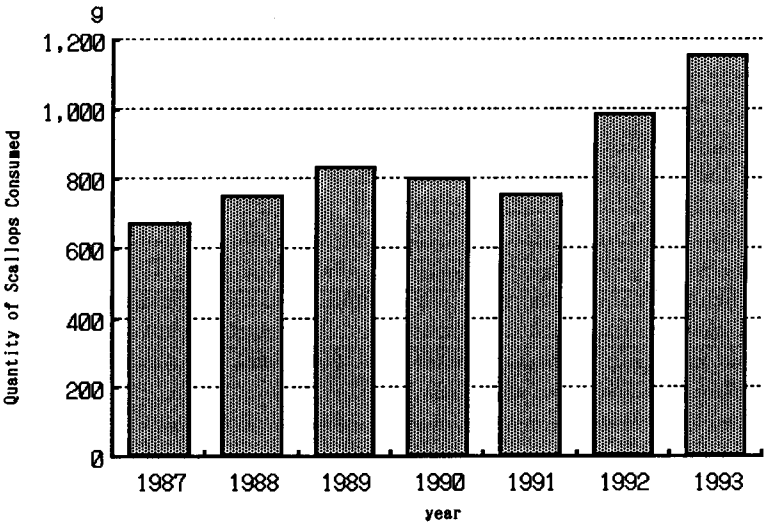

Fig. 4. Mean Quantity consumed of scallops per house hold (1987-1993).
Source: Annual Report on the Family Income and Expenditure Survey.

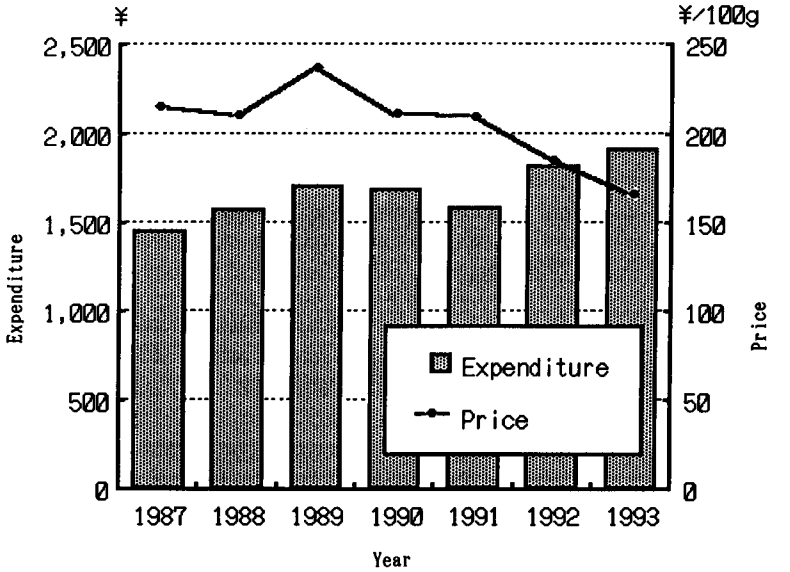

Fig. 5. Amount of expenditure for scallops and average market price (1987-1993).
Source: Annual Report on the Family Income and Expenditure Survey.

of the price decline. The amount of expenditure for scallops in 1993 was greater than that in 1992, as was the quantity consumed. The amount of expenditure for scallops in 1993 was greater than that in 1992, as was the quantity consumed. The amount of expenditure deflated by the consumer price index has been increasing for the last seven years. These figures indicate an expansion of the market for scallops

in households.

Assuming that the amount of scallops consumption is explained by its price. The fresh fissh & shellfish price, and the special demand in December, and that the elasticities are constant, the consumption of scallops is established as:

$$\log(SCQUAN) = 17.367 - 1.783 \log(SCREP) + 0.075 \log(FIREP) + 0.634 DUMDEC$$

(t-value) (7.858) (5.692) (2.790) (11.322)

$R^2 = 0.933$

$DW = 1.563$

where; SCQUAN = quantity of scallops consumed per household (g),
SCREP = real price of scallops (yen/100 g),
FIREP = real price of fresh fish & shellfish (yen/100 g), and
DUMDEC = dummy variable which explains the special demand in December (December = 1, other months = 0).

Data from the above equation are obtained from 24 monthly data sets (from January 1992 to Demember 1993). All parameters are significant at the 5% level. Since the price elasticity of demand for scallops is greater than 1, it is concluded that demand for scallops is elastic. When the price declines by 1%, the quantity of scallops consumed would increase by 1.78%. The fresh fish & shellfish price has little effect upon the consumption, because the cross elasticity for fresh fish & shellfish is very small.

The position of scallops in the consumption of fresh marine products

Fresh fish & shellfish includes 21 items in the 'Annual Report on the Family Income and Expenditure'. The purpose of this part is to distinguish scallop consumption from the other fresh marine products.

Table 1 shows the quantities of marine products consumed per household and their prices in 1993 for each item. In order to compare scallops with the other products, all data are translated to a Z-score. The Z-score is obtained from the following equations:

$$QZi = (Qi - Q)/Q_{SD}$$
$$PZi = (Pi - P)/P_{SD}$$

where; QZi = Z-score of amount of consumption for item i,
Qi = an amount of consumption of item i (g),
Q = the average of consumption quantities of 21 items (g),
Q_{SD} = the standard deviation of quantities of 21 items consumed (g),
PZi = Z-score of the price for item i,
Pi = the price of item i (yen/100 g),
P = the average of the price of 21 items (yen/100 g), and
P_{SD} = the standard deviation of the price of 21 items (yen/100 g).

The twenty-one items can be classified into four groups by this methods. The items which belong to group 1 are relatively expensive and their quantities consumed are relatively large. Group 2 includes relatively expensive and relatively small consumption items. Group 3 includes relatively inexpensive items of which consump-

Table 1. Expenditure, quanties and prices of fresh fish and shellfish.

Items	CODE	Expenditure (yen)	Quantity (g)	Price (yen/100 g)
Flatfish	A	560	173	322.77
'Sashimi' mixed set	B	9,256	2,900	319.19
Tuna	C	9,121	3,321	274.64
Sea bream	D	2,671	1,100	242.83
Shrimps & logsters	E	7,812	3,560	219.45
Crabs	F	3,457	1,453	237.87
Yellowtail	G	4,168	1,921	216.99
Bonito	H	2,624	1,515	173.13
Scallops	I	2,051	1,159	176.98
Oysters	J	1,662	936	177.54
Octopus	K	2,213	1,444	153.29
Salmon	L	3,599	2,336	154.06
Flounder	M	3,113	2,060	151.13
Horse mackerel	N	2,986	2,680	111.43
Cuttlefish	O	5,149	5,282	97.49
Corbicula ("shijimi")	P	788	874	90.23
Short-necked clams	Q	1,670	2,009	83.11
Cod	R	471	559	84.24
Mackerel	S	706	1,056	66.79
Saury	T	1,553	2,434	63.81
Sardines	U	1,277	2,008	63.60

Source: Caluculated Annual Report on the Family Income and Expenditure Survey in 1993.

tion is relatively small. The items classified into group 4 are relatively cheap and large consumption items. Scallops belong to group 2. The other members of the group 2 are flatfish, sea bream, crab, bonito, and oyster.

In order to see the relative changes in both quantities consumed and prices, Z-scores in1987 and 1993 are plotted by each item in Fig. 6. Both the prices and the quantities consumed of oyster, bonito, sea bream and flatfish have changed. The changes in sea bream and flatfish are small, while changes in oyster and bonito are greater. At least, regarding the data in 1987 and 1993, bonito has become one of the high class items. Although oyster is located near to scallops, the directions of the changes in the prices and the quantities are inverse to each other. In the case of scallops, its price has declined and the quantity consumed has increased. By contrast, oyster prices have risen and the quantity consumed has decreased. In the case of crab, in spite of the large raise of the price, the quantity consumed has largely increased. This shows that a market for crab has been developing.

As for scallops, both a decline of price and an increase in quantity consumed are observed at the same time. Only scallops among the members of group 2 shows such changes. Assuming that such changes will continue, scallops might move from group 2 to group 4 in the future. Since, as we have seen, the price elasticity of

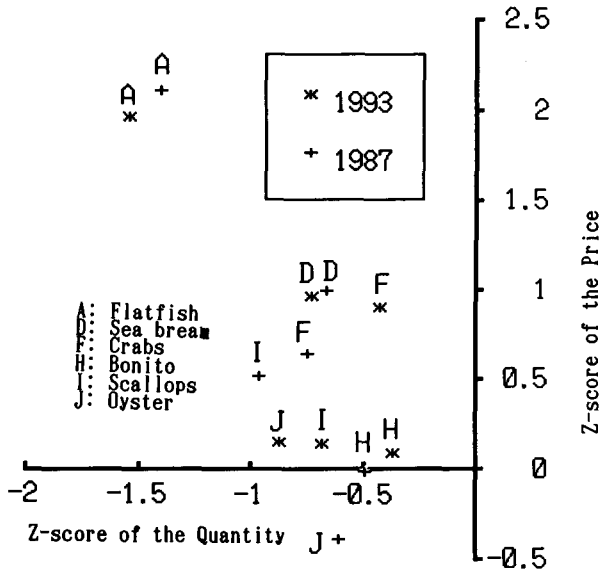

Fig. 6. Quantities consumed and prices.
Source: Annual Report on the Family Income and Expenditure Survey.

scallops is never at a low level, the decline of its price might cause an increase in demand. Although many fishermen are concerned about the decline in price due to excessive production, as concerns the demand for it in family households, it is probable that an expansion is caused by the price decline. If the price decline is regarded as one of the significant problems, it is the most important problem that the lack of flexibility in dealings between fishermen and middlemen or processing sector.

Seasonal change in the consumption of scallops

The consumption of many food types changes seasonally. Since many fisheries and aquaculture production are restricted by nature, in many cases, the seasonal changes in supply-side circumstance cause the seasonal changes in their consumption. However, even if the seasonal changes originated by the supply-side circumstance would diminish with the development of production and marketing technologies, our eating habits, which have been formed over the long run, would not change rapidly. Some cookeries are restricted by the season. For example, 'nabemono' is a typical winter cookery. In addition, demands for a number of foods generally increase at the end of the year in Japan. We call this 'nenmatsu juyo' in Japanese.

Table 2 shows the monthly fluctuations of the quantities consumed and the price for twenty fresh marine products (except 'sashimi' mixed set). The fluctuations of quantities for crab, oyster, saury and yellowtail are great, while those for tuna, cuttlefish, *Corbicula* ('shijimi' in Japanese), flatfish and flounder are small. We shall call the former group 'seasonal goods' and the latter group 'non-seasonal goods' in this paper.

Most of crab sold at markets nowadays are frozen, and most of yellowtail is produced by aquaculture. So it is possible to produce and to sell them throughout the year. For example, the majority of yellowtail is produced for the demand at the end of a year. Crab is used for 'nabemono' in winter, so demand for it in winter is larger than during other seasons. Since both fishers might be caught only in winter a long time ago, the demand for them was concentrated during the winter season. Although they are produced throughout the year today, the demand in winter is still larger than that in the other seasons. From this view point, we may say that the seasonal changes of the comsumption of these kinds of fish are principally determined by the demand-side circumstances.

Saury is caught in autumn season, and sold as fresh fish. Its fishing season is so short that demand for it has concentrated during a short period. But, in recent years, with the development of distribution technology, many frozen saury come into the market, where retailers thaw them and sell them as 'fresh fish'. Thus its seasonal changes in consumption are not determined only by the supply-side circumstance. But we cannot ignore the fact that saury is still one of the 'autumn taste' foods.

Oyster is eaten fresh only in winter, because it contains a poison during the

Table 2. Seasonality of freshfish consumption (1993).

Items	CODE	Qualitity per Month (g/month)	Variable Coefficient
Oysters	J	78.0	1.067
Crabs	F	121.1	0.837
Saury	T	202.8	0.789
Cod	R	42.0	0.717
Bonito	H	126.3	0.549
Yellowtail	G	160.0	0.418
Scallops	I	96.6	0.307
Octopus	K	120.3	0.282
Horse mackerel	N	223.4	0.268
Salmon	L	194.7	0.265
Shrimps & lobsters	E	296.7	0.249
Short-necked clams	Q	167.4	0.229
Mackerel	S	88.0	0.208
Cuttlefish	O	440.2	0.168
Sar bream	D	91.5	0.162
Corbicula ("shijimi")	P	72.8	0.150
Seadines	U	167.4	0.150
Flounder	M	171.7	0.144
Tuna fish	C	276.7	0.128
Flatfish	A	14.4	0.097

Source: Calculated Annual Report on the Family Income and Expenditure Survey in 1993.

other seasons. In this case, seasonal change in consumption is determined by its biological property; so supply-side circumstance determines the seasonal change.

Due to development of distribution technology and to the length of the fishing season, non-seasonal goods don't have any seasonal change in consumption. In addition, many of these marine products are suited to all season type cookeries. In addition, as Fig. 7 shows, we cannot distinguish which categories are most frequently consumed between these twenty items.

Marketed scallops include a fishely product called 'jimaki-mono' and an aquaculture product called 'yoshoku-mono'. In Hokkaido, scallops produced by aquaculture are primary produced on the coast of Funkawan, while the scallops from the fishery are primarily produced on the coast of the Sea of Okhotsk. The season when they are sold is different for each: faming scallops in the December through March period, and fishery scallops in the April through November period. The Hokkaido Government prohibits the sale of farming scallops in the summer because of the poison called 'kaidoku'. As for the whole market for scallops, fresh scallops are sold throughout the year. In addition, a large quantity of frozen scallops called 'tamarei' or 'gyokurei' is sold throughout the year. Perhaps, it may play a important role in household consumption for scallops. Thus, we can say that scallops have no seasonal change in the supply-side.

Table 3 displays the quantity of scallops consumed in 1987 and in 1993. Although the quantity in 1993 is greater than that in 1987 throughout the year, especially the difference in autumn season in greater than that in the other seasons. There is no qualitative reason why scallops consumption in households increases in autumn. We may, therefore, reasonably conclude that the change in quantity consumed is caused by the change in price.

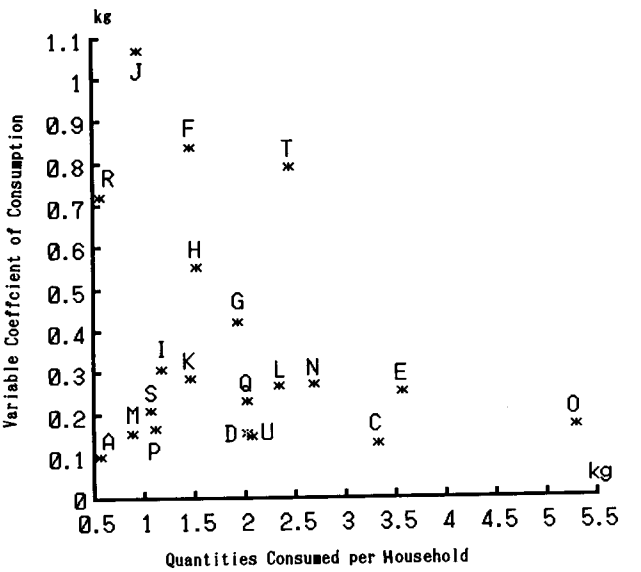

Fig. 7. Seasonal change in quantities consumed (Letter codes follow those in Table 1).
Source: Annual Report on the Family Income and Expenditure Survey.

Table 3. Rise in the quantity of scallops consumed per month.

Month	Year		Rise Ratio (%)
	1987 (g)	1993 (g)	
Jan.	57	74	29.8
Feb.	64	103	60.9
Mar.	69	100	44.9
Apr.	53	94	77.4
May	45	89	97.8
Jun.	42	83	97.6
Jul.	52	83	59.6
Aug.	59	87	47.5
Sep.	49	75	53.1
Oct.	48	88	83.3
Nov.	47	92	95.7
Dec.	93	191	105.4

Source: Caluculated Annual Report on the Family Income and Expenditure Survey.

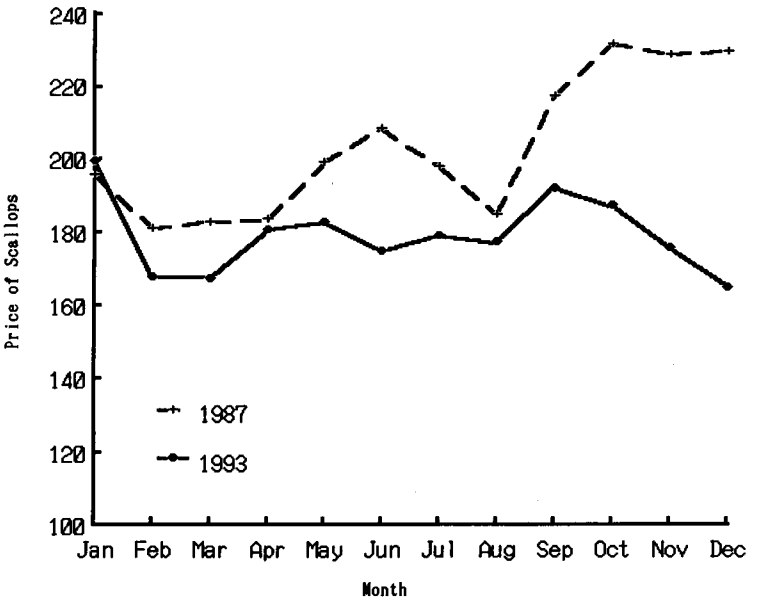

Fig. 8. Monthly fluctuation of mean scallops price (1987, 1993).
Source: Annual Report on the Family Income and Expenditure Survey.

Fig. 8 shows the change in scallops price throughout the year. In 1987, the price was at high level after summer. On the contrary, the price declined after summer in 1993 and the decline might have contributed to the increase in quantity consumed after autumn.

It can be concluded, from what has been said above, that the consumption of scallops shows no peculiar seasonality. When it is possible to keep the supply for scallops stabile throughout the year, we expect the stabile demand throughout the year.

The local changes in scallops consumption

In general, local changes exist in the consumption of marine products. The 'Annual Report on the Family Income and Expenditure Survey' devides Japan into ten districts. Table 4 shows the variance in the quantities consumed of twenty items in 1993. Because the variable coefficient for fresh fish & shellfish is 0.194, we can say that the variance is relatively small. Variable coefficients for each item are much greater than that for fresh fish & shellfish. This means that the combinations of items in consumption of marine products vary between districts.

The local changes of some items, for example, shrimps & lobsters, octopus, mackerel and short-necked clams, are relatively small. We can call them 'national items'. In contrast, the local changes of other items, for example, cods, scallops and sea bream, area relatively great. So we can call the latter items 'local items'. We find that the quantities consumed and the variable coefficients have a weakly nagative correlation ($r=-0.379$). We can say that the amount of consumption a national item is greater than that of a local item.

We applied principal component analysis in order to find the local changes for twenty items listed in the 'Annual Report on the Family Income and Expenditure Survey'. The sum of the contributions of the first principal component and that of the second principal component is 84.7%. The eigenvalues, contributions and cumulative contributions are shown in Table 5. And eigen vectors are shown in Table 6. First principal components imply the largeness of the demand as a whole, because they are positive for all variables. The difference in northern (or eastern) districts and western districts in Japan can be explained by the second principal component, because they are negative for Hokkaido, Tohoku, Kanto, Tokai and Okinawa and are positive for other districts. Okinawa is distinguished from the other districts in consumption of marine products, and Hokuriku has traditionally been combined with Kinki for all life habits.

The first principal component scores and the second principal component scores are plotted in Fig. 9. The horizontal axis indicates the first principal component, and the vertical axis the second principal component. This figure indicates that the quantity consumed of scallops is relatively small and is biased to northern (or eastern) districts. Fig. 10 shows the quantities consumed by districts. The quantity of scallops consumed in Hokkaido and Tohoku, which are the local of scallops, is larger than that in the otherdistricts. We may say that the quantity consumed changes in proportion to the distance from the locale of scallop production.

We must not forget the local differences in price. Fig. 11, which displays both the relative price for fresh marine products and the percentage of scallops for the

Table 4. Consumption of fresh fish and shellfish by district (1993).

Items	CODE	Average Quantity (g)	Variable Coefficient
Freshfish & shellfish		51,574	0.194
Cod	R	712	1.163
Scallops	I	1,350	0.978
Sea bream	D	1,197	0.689
Bonito	H	2,535	0.653
Salmon	L	2,306	0.619
Tuna fish	C	2,909	0.611
Yellowtail	G	2,040	0.608
Horse maclerel	N	2,500	0.565
Flounder	M	2,367	0.557
Corbicula ("shijimi")	P	793	0.531
Saury	T	2,512	0.485
Sardines	U	1,970	0.485
Flatfish	A	164	0.463
Shortnecked Clams	Q	1,831	0.381
Oysters	J	879	0.358
Cuttlefish	O	5,433	0.354
Crabs	F	1,467	0.346
Octopus	K	1,369	0.281
Mackerel	S	1,137	0.279
Shrimps & lobsters	E	3,608	0.213

Source: Calculated Annual Report on the Family Income and Expenditure Survey.

Table 5. Eigenvalue, proportion and cumulative.

Principal Components	Eigen Value	Proportion (%)	Cumulative (%)
1	6.6887	66.9	66.9
2	1.7781	17.8	84.7
3	0.9600	9.6	94.3
4	0.1982	2.0	96.3
5	0.1637	1.6	97.9
6	0.1122	1.1	99.0
7	0.0519	0.5	99.5
8	0.0225	0.2	99.7
9	0.0180	0.2	99.9
10	0.0060	0.1	100.0

Source: Calculated Annual Report on the Family Income and Expenditure Survey.

Table 6. Eigenvector

Eigen Vector	Principal Components		
	1	2	3
Hokkaido	0.283	−0.332	0.494
Tohoku	0.304	−0.298	0.392
Kanto	0.343	−0.267	−0.194
Hokuriku	0.326	0.148	0.273
Tokai	0.346	−0.234	−0.273
Kinki	0.366	0.182	−0.009
Chugoku	0.331	0.363	0.072
Shikoku	0.321	0.316	−0.024
Kyushu	0.283	0.440	−0.148
Okinawa	0.235	−0.440	−0.515

Source: Caluculated Annual Report on the Family Income and Expenditure Survey.

quantity consumed of fresh marine products. The relative price of scallops in Hokkaido and Tohoku is lower and the percentage of consumption of scallops is more than that in another districts. In the other districts, except Kanto, the percentages of quantity of scallops consumed are between 0.9% and 1.4%. And, except in Okinawa, the relative prices of scallops are between 2 and 3. We may,

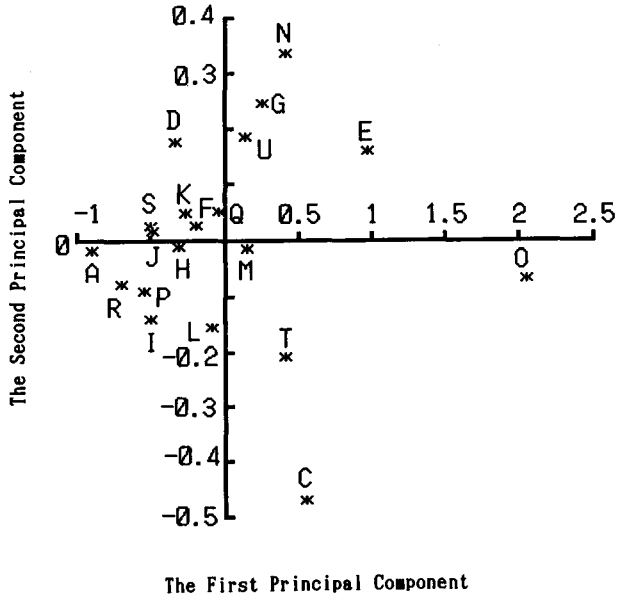

Fig. 9. Principal componet score (Letter codes follow those from Table 1).
Source: Annual Report on the Family Income and Expenditure Survey.

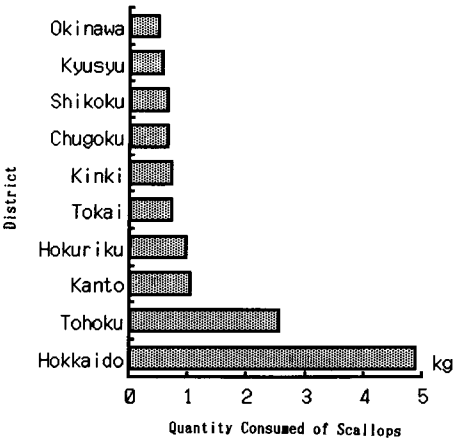

Fig. 10. Quantities of scallops consumed for districts (1993).
Source: Annual Report on the Family Income and Expenditure Survey.

therefore, reasonably conclude that, except in Hokkaido and Tohoku, scallops are one of the expensive marine foods.

Fig. 12 displays the percentage of the change in the price and in the quantity consumed for the 1987-93 period. Okinawa, Hokuriku, Kanto, Tohoku and Hok-

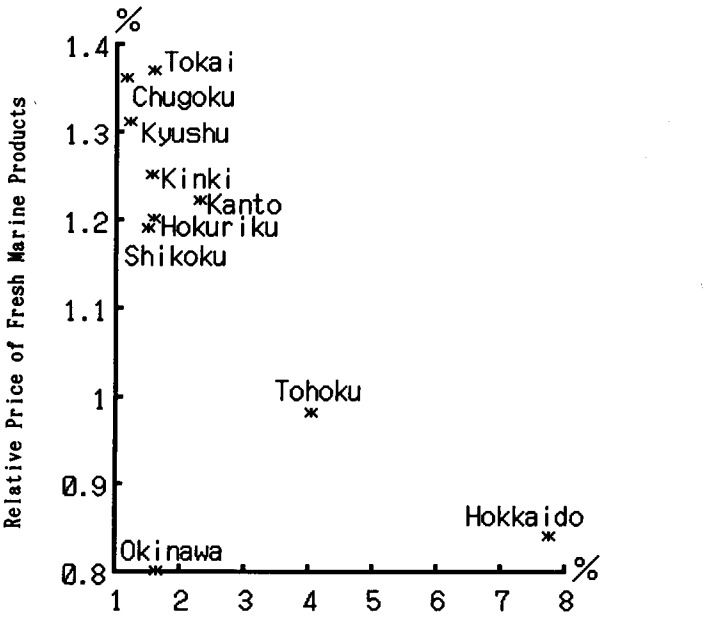

Fig. 11. Quantity ratio and price ratio (1993).
Source: Annual Report on the Family Income and Expenditure Survey.

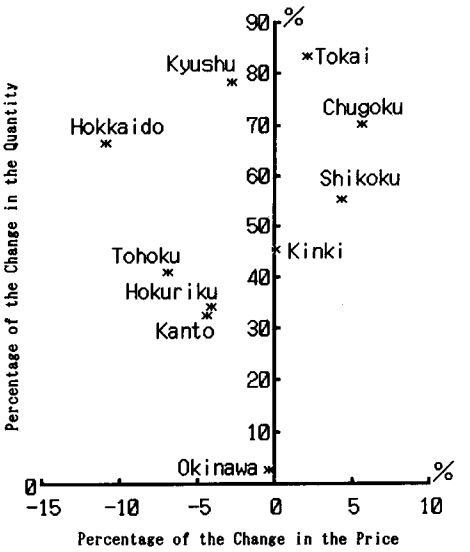

Fig. 12. Quantities and prices of scallops for districts (1993).
Source: Annual Report on the Family Income and Expenditure Survey.

kaido seem to stand on the same line. Except for Okinawa, many scallops are consumed in these districts. As the price decreases 1%, the amount of consumption increase 30% in such districts. It is likely that the decline of the price contributes to the increase in the quantity consumed of scallops in these districts.

In Chugoku and Shikoku, in spite of the increase in the price, the quantity consumed of scallops has largely increased. This implies that the demand for scallops is increasing in these districts. Although the decline of the price is slight in Tokai and Kyushu, the consumption of scallops has largely increased. The demand for scallops is increasing in these districts, too.

From above facts, we may say that scallops are developing into one of the "national" goods. However, since the consumption of scallops is larger in Hokkaido and Tohoku than that in the other districts, scallops is still one of the "local" goods. The decline of the price, which is caused by the increase of the production, but the increase in Hokkaido and Tohoku, where most of the scallops are produced, is larger than that in the other districts.

The consumption of scallops by income and age groups

Although it is necessary to know the income and the age of the consumer in order to understand their chcaracteristics, the 'Annual Report on the Family Income and Expenditure Survey' gives us only some limited knowledge on these problems. We cannot distinguish an income effect from an age effect from this statistics, because the age of household head and their income are correlated with each other. This must be kept in mind during the following discussion on scallops.

We shall survey the quantity consumed of fresh fish & shellfish and that of scallops. Not the quantity per household, but per capita, is used in this part,

because the number of family member varies with the age of the household head. The quantity consumed of fresh fish & shellfish rises to a peak in the 50–54 age class, as Fig. 13 shows, and the consumption pattern for scallops is almost same.

Although the consumption pattern of fresh fish & shellfish is similar to that of scallops, we can see the difference in the quantity of scallops consumed between age groups. Fig. 14 compares the quantities consumed of scallops with that of fresh fish & shellfish per capita, when both of the mean prices are regarded as 1. Compared with fresh fish & shellfish, scallops consumption in the 50–59 age group is large and that for those over 60 years old is small.

We cannot determine the reason for this from the 'Annual Report on the Family Income and Expenditure Survey', but we can hypothesize the following;

1) The elderly consumer doesn't know how to eat scallops well, because the scallops consumption has been expanding rather recently.
2) Scallops are not suited to the tastes of the elderly consumer,
3) The income effect acts more powerfully than the age effect on consumption of scallops.

Fig. 15, which compares the quantity of fresh fish & shellfish consumed with that of scallops, displays that the quantity of scallops consumed in high income households is greater than that in low income households.

Conclusion

In spite of the decline of consumption of fresh marine products in the long run,

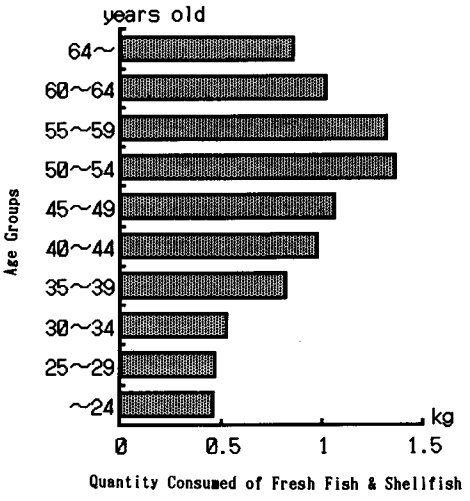

Fig. 13. Quantities of scallops consumed by age groups of household head (1993).
Source: Annual Report on the Family Income and Expenditure Survey.

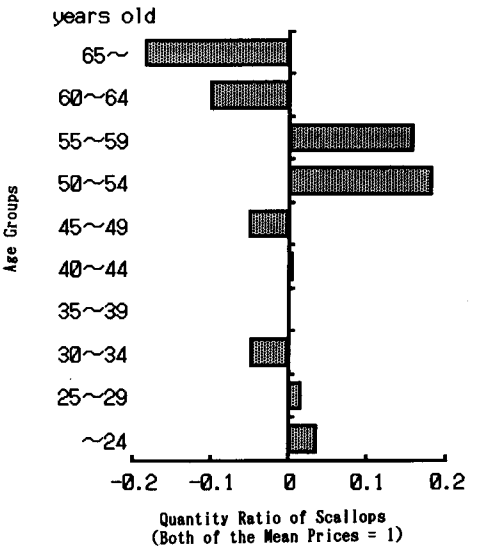

Fig. 14. Comparison of quantities of scallops consumed by age groups of household head (1993, per capita).
Source: Annual Report on the Family Income and Expenditure Survey.

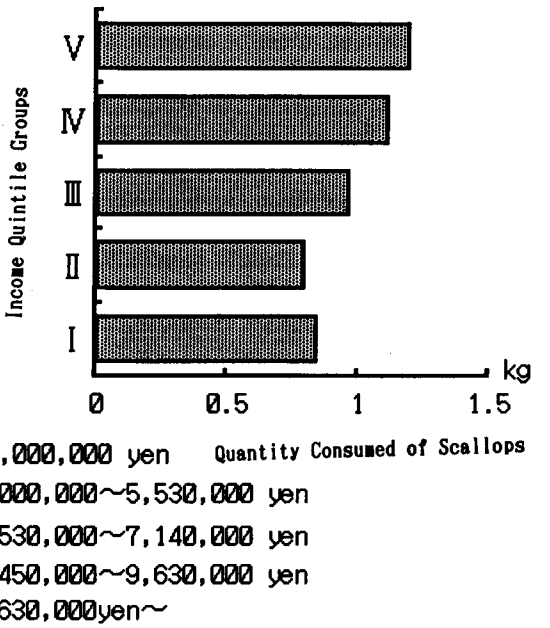

Fig. 15. Quantities consumed of scallops by income groups (1993).
Source : Annual Report on the Family Income and Expenditure Survey.

the consumption of scallops has been increasing. Since the price elasticity for scallops is relatively great in households, the decline of scallops price has caused an expansion of its consumption. The local differences, however, are still large. The quantity of scallops consumed in Hokkaido and Tohoku is much greater than that in the other districts. Scallop prices in such districts are relatively low. We can say with fair certainly that scallops is still remain at the position as one of the "local" goods. Paradoxically speaking, however, this implies that scallops might become one of the "national" goods. In order to become a "national" good, the decline of scallops price in the districts except Hokkaido and Tohoku is one of the most necessary conditions.

Marketing promotion for the districts in which scallops are not highly consumed is necessary. In 1993, the Hokkaido Fishery Cooperative Combination Association ("Hokkaido Gyoren") carried out a sales drive at Fukuoka City. Although we do not yet the effect of the sales drive on the consumption of scallops there, we believe such activities will benefit the fishery.

Since, as we said at the outset, the analysis in this paper concentrated on the consumption of scallops in households, the knowledge from this research is limited. It is important to note that the consumption in households is only a part of the entire consumption of scallops. As for fresh scallops, it is expected that the demand in restaurants in larger than that in households. We must analyze the consumption of scallops in other sectors. But, unfortunately, we have no data including the whole consumption of scallops, so we should make some care studies in order to consider the whole consumption of scallops.

In addition, the demand for various foods made from scallops, for example, the dried adductor musels of scallops, must be considered. The export demand plays an important role in these foods. As the yen becomes stronger, it is reasonable that the products which have been produced for the export demand will shift to the domestic market and the supply will become excessive in the domestic market.

Although the fishermen attach importance to the price decline caused by excessive production, at least, because the elasticity of price for scallops in household is high, the price decline must expand the last demand for scallops. If, in spite of high elasticity for consumer, the yield would decreuse, we must conclude that there are some problems in the distribution system of scallops. The distribution system of scallops is very complicated. However, only limited data is available for us. For example, statistics at several central wholesale markets would give us some important knowledge. However, the large part of scallops don't pass through central wholesale markets. It is believed that the majority of scallops which are sold at super markets don't pass through central wholesale markets. In addition, recently, small-size scallops called "baby-hotate", which means "very small scallops", are imported from China. The competition between domestic scallops and Chinese scallops has yet to occur at the market, but many people are afraid that severe competition between Chinese and Japanese scallops may occur.

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