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MARKET INTEGRATION IN THE PHILIPPINE MILKFISH INDUSTRY

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By

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LIST OF ABBREVIATIONS

BAS	-Bureau of Agricultural Statistics
BAEcon	-Bureau of Agricultural Economics (now BAS)
BFAR	-Bureau of Fisheries and Aquatic Resources
DFL	-Dalahican Fish Landing
FAO	-Food and Agriculture Organization
LLDA	-Laguna Lake Development Authority
NEDA	-National Economic Development Authority
NFPC	-Navotas Fishing Port Complex
IFPC	-Iloilo Fishing Port Complex
PCARRD	-Philippine Council for Agriculture Research and Resources and Development
PFDA	-Philippine Fisheries Development Authority
PFMA	-Philippine Fish Marketing Authority
SEAFDEC	-Southeast Asian Fisheries Development Center

Abstract of the thesis presented to the Senate of Universiti Pertanian Malaysia in partial fulfilment of the requirements for the degree of Master of Science in Fisheries Economics.

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September, 1989

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Sufficiency in milkfish production in the Philippines was mainly attributed to the improved production technologies. However, sufficiency in food does not come from production increases alone. Efficiency in marketing should be attained to guarantee an adequate supply of milkfish in consumption areas at equilibrium price. An efficiently integrated market is characterised by prices that are interrelated.

The study focuses on the analysis of milkfish prices from 1978 to 1987 with the end view of assessing the degree of integration between Metro Manila and selected regional production centres.

Ravallion's autoregressive distributed lag model (1986) and cross-correlation of residuals by Box and Pierce (1970) revealed that the Philippine milkfish market is not well-integrated. The hypotheses of long-run integration and the absence of local market characteristics were accepted while short-run integration and segmentation were rejected. Hence, the process of price adjustment in the regional market do not fully reflect the price information from the reference market within a short time period but equilibrium could be attained in the long-run. Price formation runs from the wholesale to the retail market and furthermore from the reference market to the regional production centres.

The low levels of integration are often associated with margins in excess of the marketing costs since arbitragers could use information about price differences profitably. Non-economic profits exist in markets laden with structural imperfections. Hence, the need for the government's attention to save the declining profitability of milkfish production juxtaposed with the enrichment of influential intermediaries in the face of increasing productivity.

Abstrak tesis yang dikemukakan kepada Senat Universiti Pertanian Malaysia sebagai memenuhi sebahagian daripada syarat untuk Ijazah Master Sains.

INTEGRASI PASARAN DI DALAM INDUSTRI BANGUS FILIPINA

oleh

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Pengeluaran bangus di Filipina yang mencapai taraf sara-diri adalah disebabkan oleh perkembangan teknologi pengeluaran yang besar. Walau bagaimanapun, peningkatan pengeluaran sahaja tidak dapat menjamin kecukupan makanan. Kecekapan pemasaran perlu juga ditingkatkan untuk memastikan penawaran bangus di kawasan pengunaan mencukupi dan di paras harga yang seimbang. Ciri pasaran yang berintegrasi dan cekap adalah harga yang saling berkaitan.

Kajian ini memberi tumpuan kepada analisis harga bangus bagi tempoh 1978 hingga 1987 untuk menilaikan darjah integrasi di antara Metro Manila dan beberapa kawasan pengeluaran di daerah terpilih.

Penggunaan model lat teragih autoregresif Ravallion (1986) dan korelasi silang sisa/reja mengikut Box dan Pierce (1970) ke atas data kajian, menunjukkan pasaran bangus Filipina adalah tidak berintegrasi. Hipotesis integrasi jangkapanjang dan ketiadaan ciri-ciri pasaran tempatan diterima manakala integrasi jangkapendek dan segmentasi ditolak. Ini bermakna proses penyelarasan harga di dalam pasaran tempatan tidak menerangkan sepenuhnya maklumat harga dari pasaran rujukan dalam tempoh yang singkat tetapi keseimbangan mungkin tercapai dalam jangka panjang. Penentuan harga bermula dari pasar borong ke hala pasaran runcit dan seterusnya dari pasaran rujukan ke kawasan pengeluaran tempatan.

Darjah integrasi yang rendah sering berkaitan dengan keadaan dimana selisih margin melebihi kos pemasaran dan yang membolehkan pengarbitraj menggunakan maklumat perbezaan harga ini untuk mendapatkan keuntungan. Keuntungan bukan-ekonomi wujud di dalam pasaran yang mengandungi struktur yang sempurna. Ini juga bermakna, kerajaan perlu memberi perhatian dan mengawal industri bangus yang mengalami keuntungan pengeluaran yang merosot.

CHAPTER I

INTRODUCTION

Background Information

Projected growth in population of about 2.5 percent in the Philippines in 1987 will exert pressure on the food production sector in the country (Food and Agriculture Organization, 1987). Sufficiency in food does not come from production increases alone. Marketing and distribution play major roles in attaining sufficiency in food supply. Efficiency in distribution should be attained to realize increased benefits among producers and consumers.

Fish marketing in the Philippines is gaining attention in various research institutions in view of the significance of fish in the diet of the majority of Filipino families. Average annual consumption of fish in the country is estimated at 32 kg per year which was short of the 36.5 kg minimum requirement set by the National Nutrition Council (Philippine Fish Marketing Authority, 1979). On the availability of fish supply, the National Economic Development Authority (NEDA) reported that per capita available fish and other marine products declined from 50.3 kg per year in 1984 to 47.5 kg per year in 1985. This decline in the availability of fish and other marine

products is an offshoot of a similar trend in fish production both in the commercial and municipal capture fisheries sector (Table 1). This production record showed that the fisheries sector as a whole had a 1.4 percent decline in production from 1984 to 1985. On the contrary, production from aquaculture increased by 3.5 percent. Nevertheless, the municipal sector will still account for the majority of total fish production. It is projected that coastal capture fisheries will increase at an annual rate of 4.6 percent per year, and aquaculture will expand at a rate of 9.8 percent per year (Schmittou, *et al.*, 1985). These production trend is likely to cause alarm on marine fisheries sector while the increase in aquaculture production may be the saving factor to alleviate the declining fish supply from the former sector.

Table 1

Volume and Value of Fish Production
by Sector, Philippines, 1985-86

Fisheries Sector	1984		1985	
	Volume (th mt)	Value (m pesos)	Volume (th mt)	Value (m pesos)
Commercial fishing	513	6,521	512	7,857
Municipal and sustenance fishing	1,089	11,862	1,045	14,716
Aquaculture	478	7,266	495	8,724
Total	2,080	25,650	2,052	31,897

Source: NEDA, 1988. p.5.

In the late seventies, it was perceived that the establishment of landing areas in strategic places in the country will stimulate production for both marine and aquaculture species. These landing areas are also expected to enhance investment in the fishing industry and in ancillary services such as fish processing and cold storage aside from the primary goal of reducing fish consumption deficit. In this regard, an average annual growth rate of 5.6 percent was estimated for the fisheries sector. This will be more than enough to meet consumption demand estimated to grow at an average annual rate of 4.2 percent. Consequently, this will guarantee availability of fish in deficit regions if there is an efficient system of distribution.

In the case of milkfish, *Chanos chanos* (Forsskal), efficiency in distribution has to be attained in view of the geographical location of the production centres and consumption areas (Figure 11-Appendix A). The top milkfish producing provinces and their contribution to the 1987 total output are shown in Table 2. Bulacan, the top milkfish producer, is in Central Luzon while Capiz and Iloilo are in Western Visayas. Pangasinan is in Ilocos region while Zamboanga is far down the Mindanao area. Rizal which is adjacent to Metro Manila ranked seventh.

Aggregate production of milkfish was recorded at 199.25 thousand metric tons (mt) in 1987 which accounts for about 71 percent of the total fish produced by the aquaculture sector (Table 2). Ninety percent of milkfish in the country comes from brackishwater fishponds. The rest are from freshwater, marine and other inland sources.

Consumption centres are likewise dispersed in the archipelago with Metro Manila as the biggest followed by the cities of Davao, Cebu, Zamboanga, Bacolod, Iloilo and Cagayan de Oro in the order of mention. Milkfish then become one of

Table 2

Volume of Milkfish Production in Top Ten Provinces by Source, Philippines, 1987 (in mt)

Province	Brackishwater Fishpond	Fishpen	Marine	Inland	All Sources	%
Bulacan	32,959	22	9	-	32,990	17
Capiz	22,232	-	3	-	22,235	11
Iloilo	19,570	-	-	-	19,570	10
Pangasinan	16,971	-	-	-	16,155	8
Pampanga	16,154	-	-	1	16,155	8
Negros Occ.	15,386	-	41	-	15,427	8
Rizal	-	13,354	-	497	13,851	7
Zamboanga Sur	8,427	182	132	-	8,741	4
Aklan	5,157	-	-	-	5,157	3
Metro Manila	621	3,291	-	-	3,912	2
Others	42,314	887	516	520	44,237	22
Total	179,791	17,736	701	1,018	199,246	100

Source: BAS, 1988. p.4.

the most commonly traded fish species in most landing centres and in the retail markets. Latest available data from the Philippine Fisheries Development Authority (PFDA) revealed that milkfish accounts for 7.14 percent of the 14.77 thousand mt total milkfish unloadings in Navotas in 1987. In Iloilo, milkfish shared 20.51 percent of the total 17.60 thousand mt total fish unloadings during the same year. This could be attributed to the increasing productivity of milkfish throughout the country and to the declining share of marine fish catch to the total fishery production.

Table 3 shows the breakdown of milkfish traded in Navotas, Metro Manila by provincial origin. More than half of the total unloadings in 1986 and 1987 comes from the province of Laguna which is adjacent to Metro Manila, about 50 km to the south. This is followed by Iloilo, Negros Occidental, Rizal and Quezon with relatively smaller percentage shares of the market.

Research and development since the 1970's have shown that milkfish production through aquaculture has the potential to alleviate fish consumption deficiency. This has been manifested in the overall increase in production from 1978 to 1987 (Table 4). However, the milkfish industry suffered a series of production setbacks from 1983 to 1986 due to the rise in demand for prawn from local and foreign markets. This situation motivated some of the brackishwater fishpond

operators who can afford the cost of prawn culture to engage either in polyculture of prawn and milkfish or in monoculture of prawn. Milkfish production therefore, generally relied on medium and small fish farm operators.

Table 3

Volume of Milkfish Unloadings by Provincial Origin, Navotas, Metro Manila, Philippines, 1986-87 (tubs of 45 kg)

Source	1986		1987	
	Volume	% Share	Volume	% Share
Bulacan	339	0.26	591	0.17
Zambales	317	0.24	519	0.16
Batangas	64	0.05	131	0.04
Laguna	101,810	77.47	176,054	53.54
Mindoro	839	0.64	204	0.06
Palawan	285	0.22	522	0.16
Quezon	2,765	2.10	2,518	0.76
Rizal	8,054	6.13	3,763	1.14
Camarines Sur	111	0.18	81	0.02
Masbate	4	nil	80	0.02
Capiz	50	0.04	1,522	0.46
Iloilo	8,829	6.72	105,180	31.99
Negros Occ.	7,467	5.68	36,284	11.03
Cebu	144	0.11	416	0.13
Zamboanga	230	0.18	718	0.22
Others[a]	108	0.08	237	0.27
Total	131,416	100.00	328,829	100.00

[a]Includes La Union, Samar and Negros Or.

Source: PFDA, 1988. p.7-69.

In view of the polyculture of milkfish and other species, the assessment of the area specifically devoted to milkfish and consequently, the estimation of annual milkfish productivity become difficult. The total brackishwater and fishpen area devoted to milkfish, prawn, tilapia and other species started to decline in 1984 (Table 4). Nevertheless, the productivity in brackishwater ponds showed an increasing trend from 574 kg/ha/year in 1970; 605 kg/ha/year in 1975; 771 kg/ha/year in 1980; and 870 kg/ha/year in 1982. Milkfish accounted for

Table 4

Volume and Value of Milkfish Production, and Area of Brackishwater Fishponds and Fishpens in Operation in the Philippines, 1978-87

Year	Area[a] (ha)	Volume (th mt)	Growth Rate (%)	Value (m pesos)	Growth Rate (%)
1978	176.12	127.02		1,016.15	
1979	176.12	138.91	9.36	1,250.17	23.03
1980	176.12	171.94	23.78	1,753.81	40.29
1981	208.26	236.33	37.45	2,599.64	48.23
1982	208.26	252.16	6.70	2,993.10	15.14
1983	225.21	245.26	(2.74)	3,288.91	9.88
1984	234.49	241.32	(1.61)	3,996.18	21.50
1985	234.12	195.66	(18.92)	4,527.57	13.30
1986	234.08	184.91	(5.49)	4,972.23	9.82
1987	228.22	199.25	7.76	4,531.94	(8.85)

[a] Refers to total brackishwater fishponds and fishpens only (freshwater fishponds not included) where milkfish and other species are produced. Milkfish accounts for 73% of the production; prawn, 12%; tilapia, 6%; carp, 1%; and other species, 8%.

Source: BAS, 1988. p.3

90 percent of the production from brackishwater ponds. Higher levels of productivity estimated at 2,252 kg/ha/year in 1981 was likewise recorded for freshwater pens where milkfish accounted for 99 percent of total production (Smith and Chong, 1984a).

Although the shift from milkfish to prawn culture indicated further decline in milkfish pond area, milkfish production in 1987 was higher by about 7.76 percent than the 1986 level (Table 4). This may be attributed to improved techniques in milkfish culture and increased stocking rate during the reference period (Bureau of Agricultural Statistics, 1988). The study on input-output relationship based on a survey of 324 milkfish producers in the Philippines by Chong and Lizarondo (1982) revealed that practices such as supplementary feeding and high stocking rate significantly increase production.

Although there have been production setbacks, the value of milkfish production showed an increasing trend from 1978 to 1987 (Table 4). In fact, higher growth rate in value of milkfish production was recorded during the period of production shortfalls. This could be due to the insufficiency of supply such that there were increases in the wholesale price by 69.44 percent and in the retail price by 70.09 percent from 1983 to 1984. The change in price in the following year is also high relative to the other periods. On the contrary, the

wholesale price of milkfish declined in 1987. This could be due to the increase in volume offered for sale such that price levels returned to reasonable levels.

Volume of milkfish exports likewise showed erratic growth rate from 1978 to 1987. Although in general, export of chilled or frozen milkfish dramatically increased from 150 mt in 1978 to 1,689 mt in 1987 (Table 5). Similarly, export of milkfish which constitute live fingerlings and processed milkfish increased ten-folds from 150 mt in 1978 to 1,794 mt in 1987 (Table 6). Despite the fluctuation in the volume of exports, its value in the international market showed a consistently increasing trend except in 1987 where total value of chilled or

Table 5

Total Volume and Value of Exports of Processed Milkfish, Philippines, 1978-87

Year	Volume (mt)	Growth Rate (%)	Value (th pesos)	Growth Rate (%)
1978	170		2,697	
1979	340	100.00	4,715	74.82
1980	565	66.18	8,656	83.58
1981	528	(6.55)	8,571	(0.98)
1982	908	71.97	13,148	53.40
1983	1,241	36.67	23,147	76.05
1984	1,158	(6.69)	29,484	27.38
1985	1,587	37.05	60,855	106.40
1986	1,864	17.45	88,458	45.36
1987	1,794	(3.76)	80,204	(9.33)

Source: BAS, 1988. p. 6.