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The Impact of Imports, Including Farm-Raised Shrimp, on the Southeast Shrimp Processing Sector

Prepared by:

Kenneth J. Roberts
Office of Sea Grant Development
Louisiana State University

Walter R. Keithly
Coastal Fisheries Institute
Louisiana State University

Charles M. Adams
Food and Resource Economics Department
University of Florida

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U.S. Department of Commerce
Robert Mosbacher, Secretary

National Oceanic and Atmospheric Administration
John A. Knauss, Administrator

National Marine Fisheries Service
William W. Fox, Jr., Assistant Administrator
for Fisheries

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ABSTRACT

Processing activities of southeastern shrimp processors increased in recent years. This activity was linked to an increase in shrimp imports. An initial source of the new supply was Ecuador. Farming of shrimp in pond systems there rapidly increased United States purchases to a record 101 million pounds by 1987. Shrimp from China and Taiwan added another 80 million pounds to United States supplies by 1987. Imports primarily from shrimp farming nations were thereby recognized by some processors as a new source of raw material. Twelve of the surveyed processors in the Southeast began use of imported shrimp after 1984. New sources of supply introduced an element of stability to the southeastern industry for those processors using the shrimp. Stability in terms of entry and exit among the region's establishments utilizing imports was found to be higher than non-users. Hence, as more establishments adopt the use of imports, especially farm-raised imports, in their processing activities, total industry stability in the Southeast may be expected to rise. The analysis indicated a possible decline in industry concentration in 1987. This decline, to the extent that it might be related to increasing raw material availability and hence, less ability among the larger firms to exhibit some control over input usage, suggests that an additional decline in concentration might be forthcoming as aquaculture supplies expand. Exporting countries with farmed shrimp supplies could at some point lessen these influences on southeastern processors if they increase their value added processing.

INTRODUCTION

Consumers of seafood in the United States purchase both domestically processed products and products imported in processed form. Based on an edible-weight measure, the 1988 U.S. seafood consumption level was 3.8 billion pounds. With approximately 65% of supply being of imported origin, the domestic supply deficit does not appear to constrain either the quantity of seafood demanded or final U.S. consumption. As proof, per capita consumption progressed at a record pace in the 1980's.

The domestic seafood processing sector also utilizes imports to avoid raw material shortages. Though the extent of utilization is unknown and varies from one company to another, the practice is thought to be growing. It is especially apparent in some of those situations where domestic harvest falls far short of consumption, such as shrimp.

The commercial harvesting sector is the one component of the U.S. seafood industry that has generally been unable to make the needed adjustments in light of the growing import base. Not unexpectedly, therefore, the origin of requests for relief from perceived problems associated with increasing imports is harvesting sector based.

In the southeast U.S., shrimp harvesters have sought regulatory relief from burdensome imports. Since 1975, three efforts aimed at minimizing problems thought to arise from imports have ended without beneficial results. The International Trade Commission (ITC) through the public hearing process in 1975 reacted to a petition filed by the National Shrimp Congress. The subsequent investigation in 1976 sought to determine if shrimp products identified in item 114.45 of the Tariff Schedules of the U.S. were being imported in quantities that caused serious injury to the domestic shrimp industry. The domestic industry analyzed by ITC included harvesting and processing. The analyses and public testimony resulted in a finding of serious injury to the domestic shrimp fishing industry. Adjustment assistance permitted in Title II of the Trade Act was approved to allow shrimp boat operators to obtain loans or loan guarantees. This, it was reasoned, would make domestic shrimp producers competitive with foreign producers.

While the analyses and public testimony resulted in a finding of injury to the domestic fishing industry, the Commission did not find damage to the domestic shrimp processing industry. During its investigation, the Commission did document use of imported shrimp by some processing companies. There was no information, however, as to the percentage of imported shrimp that received further processing or the significance of import supplies to southeast processors.

The domestic shrimp harvesting industry was found to be seriously injured while domestic shrimp processing companies were not. It was not until approximately five years later that U.S. Senator John B. Breaux of Louisiana, then a Representative, pointed out that the Administration had actually failed to provide a remedy (Breaux 1981). Rep. Breaux authored a bill to formulate a policy to provide for domestic shrimp industry protection (H.R. 4041). A temporary five-year import quota combined with a 30 percent ad valorem tariff was

proposed. Although the bill failed to attain support necessary for passage, it is significant because attention was focused on harvesting only.

The focus remained on the shrimp harvesting sector when the International Trade Commission in 1985 again evaluated the imported shrimp situation. Renewed supply increases from imported sources were being experienced. The often forecasted successes of shrimp farming companies were becoming reality. The prospect of additional shrimp farming
successes in Central America, South America, and Asia loomed on the business horizon. In explaining their situation to the International Trade Commission, the U.S. Gulf of Mexico and South Atlantic shrimp harvesters claimed:

1. Harvesting businesses were being injured as a result of imports, and

2. Shrimp industries in foreign countries benefit from government assistance, which artificially allows their products to be more competitive in U.S. markets.

Foreign shrimp producers contended:

1. Importers have historically provided a large and necessary share of the U.S. shrimp supply since domestic supply cannot meet U.S. demands.

2. In many cases, imported shrimp commands a higher price than domestic shrimp in the U.S. market.

3. Tariffs or quotas on U.S. imports of shrimp would increase domestic shrimp prices to the point where the quantity of shrimp demanded and shrimp consumption would drop.

Following a staff review of information and a public hearing, the ITC chose simply to issue a report rather than recommend actions.

A common element of the shrimp import deliberations over the past fifteen years is the relative lack of information on the southeast shrimp processing industry. The role of shrimp imports throughout the region's shrimp processing industry must be depicted in order for a comprehensive evaluation of the import issue to be developed. It is with this orientation that the analysis presented in the report was pursued.

OBJECTIVES

The shrimp processing sector is the largest component of the Southeastern seafood processing industry. The overall goal of the project was to provide an understanding of the impacts of imported shrimp, especially farm-raised, on the processing sector. The following objectives were proposed to meet the goal:

1. Determine the significance, dependence, and product uses of imported, especially farm-raised, shrimp in the southeastern shrimp processing sector.

2. Determine structural changes that have occurred in the southeastern shrimp processing sector which are attributable to the recent influx of imports in general and particularly farm-raised imports.

SOUTHEAST SHRIMP PROCESSING - PREVIOUS RESEARCH

The shrimp supply situation that served as a stimulus for the project was one of increasing availability. Shrimp imports were the origin of the supply increase. The efforts in the 1980's to lessen the supply increase emanated primarily from the shrimp harvester level. The processing level did not actively participate in these efforts. This may be because it had already become too dependent on imported raw material to aggressively participate.

In an early 1970's study, Prochaska and Andrew (1974) indicated a growing deficit in shrimp landings relative to processing needs in the southeastern states. They found the 1960 volume of processed shrimp products to be equal to the volume landed, based on National Marine Fisheries Service statistics. By 1970 a shrimp supply deficit had developed. Processed shrimp products (live-weight equivalent) amounted to 35 percent more volume than did landings in the Southeast. An important issue is then evident--post 1970 growth in the shrimp processing industry depended on shrimp supplies from outside the region. Since essentially all domestic supplies of warm-water shrimp are attributed to the region, additional raw material supplies could only occur from foreign sources. International supplies at that time were related to the natural fisheries. Shrimp harvests were noted to be near maximum sustainable yield potential (ibid.). Prospects for supplementing traditional domestic and import supplies with shrimp from aquaculture businesses were not evident at that time.

The extent of imported shrimp used by domestic processors in Florida was documented for 1972 by Alvarez (1974). He concluded that 40 percent of the shrimp utilized by Florida processors was secured from foreign sources. Florida was not portrayed as representative of all other processing states. However, Florida at that time, was the largest shrimp processing state by size, accounting for 23 and 24 percent of U.S. processed shrimp quantity and value, respectively. Processors identified a scarcity of shrimp as the most significant problem facing the Florida industry.

At a later date, Roberts and Pawlyk (1986) analyzed the Louisiana shrimp processing sector. They concluded that imported shrimp represented only about two percent of shrimp processing activities in Louisiana during 1983. At the same time, they found that almost a quarter of Louisiana's shrimp catch was directed out of state for processing in 1983. This year happened to be one of abnormally low harvest. It therefore seems likely that even a larger portion of Louisiana's annual shrimp harvest may leave the state for processing in years when production is above normal, given short-run capital constraints within the processing sector.

Though no studies have been conducted evaluating either shrimp import usage or domestic shrimp production usage among processors in other southeastern states, it is generally recognized that Florida processors have historically been most dependent on imports as a source of raw product while Louisiana processors have been least dependent. Therefore, other of the region's states are thought to be linked to imported shrimp somewhere in the range between Florida and Louisiana.

Table 1. Shrimp landings and processing in the Southeast, and U.S. imports, 1970-87.

Year	Landings	Processing	Imports
	------ 1,000 lbs. headless (shell-on) ------		
1970	158,183	227,548	247,130
1971	162,903	221,224	215,073
1972	160,139	216,065	254,534
1973	130,261	193,139	232,292
1974	134,378	181,154	270,516
1970-74 avg.	149,173	207,826	243,909
1975	122,856	157,546	231,522
1976	148,853	202,585	271,894
1977	178,516	231,985	271,811
1978	169,133	242,621	240,414
1979	150,481	218,727	269,263
1975-79 avg.	153,968	210,693	256,981
1980	152,004	198,717	258,069
1981	179,364	229,915	259,112
1982	148,369	218,626	319,596
1983	141,795	220,673	421,179
1984	172,433	251,594	422,340
1980-84 avg.	158,793	223,905	336,059
1985	183,253	255,047	452,232
1986	206,118	288,768	492,005
1987	176,433	260,429	583,030
1985-87 avg.	188,601	268,081	509,089
1970-87 avg.	**159,748**	**222,051**	**317,334**

Sources: Landings data are compiled from United States Department of Commerce, Fisheries of the United States, 1987. Processing data are compiled from United States Department of Commerce, Fishery Statistics of the United States (1970-73 issues and unpublished data provided by the National Marine Fisheries Service, Fisheries Statistics Division. Import data are compiled from United States Department of Commerce, Fisheries of the United States (various issues).

Shrimp processing in the region has been depicted as a dynamic industry exhibiting a decreasing number of establishments and no growth in deflated average sales per establishment since 1976-80 (Keithly et al., 1988). It was with this background that a personal interview procedure was designed for southeastern shrimp processors in the fall of 1988. This first region-wide documentation of the imported and farm-raised shrimp usage was linked to prevailing trends in the industry. The linkage was facilitated through use of processing plant data for southeastern firms collected by the National Marine Fisheries Service.

Shrimp Processing, Import Significance

Meeting the initial objective of determining the significance, dependence and product uses of imported shrimp requires identification of the total import situation; especially in relation to Southeast shrimp landings and processing activities in the Southeast. Some information to help make this assessment is contained in Table 1. U.S. shrimp imports increased during the 1970-87 period, as shown in Table 1, where the annual total of all product forms of imported shrimp is expressed on a heads-off (shell-on) shrimp-weight basis. Imports, which averaged 243.9 million pounds during 1970-74, increased to 336.1 million pounds by 1980-84 and increased again to 509.1 million pounds during 1985-87. Overall, the 1985-87 annual average is more than twice that of 1970-74.

Much of the import growth, as indicated in Table 1, has been post 1981 and generally represents increasing imports from those countries that have successfully developed shrimp-farming operations. These operations are situated in more than thirty countries worldwide (see United States Department of Commerce, Aquaculture and Captive Fisheries: Impacts in U.S. Seafood Markets for a detailed list of countries), though five countries--China, Taiwan, Indonesia, Thailand, and Ecuador--constitute the bulk of cultured shrimp production. U.S. imports of shrimp from these five countries, expressed on a headless shell-on basis, are given in Table 2 for the 1975-87 period. As indicated, total imports from these countries have increased significantly during the period considered. For example, the 1985-87 annual average of 191.7 million pounds is more than five times the 1975-79 average and more than twice the 1980-84 average. The 1985-87 average is almost 160 million pounds greater than the 1975-79 average. An examination of the data contained in Tables 1 and 2 illustrates that much of the U.S. shrimp import growth in recent years centers around a relatively few farm-raised shrimp producing countries.

While U.S. imports of shrimp have expanded significantly during the 1970-87 period, the harvest of shrimp in the Southeast has not (Table 1). Though exhibiting considerable year-to-year variation, the region's landings of shrimp tended to fall within a range of 150-160 million pounds. In fact, average landings for the 1970-74, 1975-79, and 1980-84 periods differ by no more than 9 million pounds. The 1985-87 annual average of 188.6 million pounds is substantially above the 18-year norm, mostly because of an exceptionally large harvest in 1986. Sustained landings at this higher level are not anticipated.

Processed shrimp production in the Southeast, measured on a raw headless (shell-on) shrimp equivalent weight basis, exhibited little or no tendency to increase or decrease until

Table 2. U.S. imports of shrimp from selected shrimp farming countries, 1975-87.

Year	Ecuador	Taiwan	Thailand	Indonesia	China	Total
	---------- 1,000 lbs. headless shell-on weight ----------					
1975	8,627	8,242	4,362	1,929	1,713	24,873
1976	9,817	7,952	4,747	6,757	2,383	31,656
1977	9,155	5,395	6,107	7,408	627	28,692
1978	11,770	5,146	6,693	6,816	81	30,506
1979	14,518	12,273	17,255	7,660	3,839	55,545
1975-79 Average	10,777	7,801	7,833	6,114	1,729	34,254
1980	20,784	8,241	15,142	6,299	1,285	51,751
1981	25,048	8,015	11,000	1,005	6,182	51,250
1982	36,936	12,969	13,055	1,252	3,611	67,823
1983	52,401	27,165	34,013	1,799	2,583	117,961
1984	47,091	24,120	32,887	1,911	3,845	109,854
1980-84 Average	36,452	16,102	21,219	2,453	3,501	79,728
1985	44,690	40,775	43,688	2,085	7,476	138,714
1986	62,589	49,054	41,210	2,582	22,925	178,360
1987	103,708	58,063	40,547	4,072	51,612	258,002
1985-87 Average	70,329	49,297	41,815	2,913	27,338	191,692

Source: Compiled from unpublished data collected by the U.S. Bureau of Census and maintained by NMFS.

the late 1970s early 1980s (Table 1). For example, the 1975-79 average of 210.7 million pounds within three million pounds of the 1970-74 average.

While the region's 1970-79 period can be characterized as one of relatively stable processed shrimp production, the 1980-87 period can be characterized as one of expanding activities (Table 1). Processing plant output averaged 268.1 million pounds in 1985-87, almost 45
million pounds above the 1980-84 average and more than 57 million pounds above the 1975-79 average.

As shown in Table 1, the region's processed shrimp production exceeded landings by a large, and increasing, amount. During the 1970-74 and 1975-79 periods, average processing output exceeded average landings by about 55 million pounds. By 1980-84 the difference had increased to about 65 million pounds and by 1985-87 it was 80 million pounds.

Three explanations can be posited for the large, increasing difference between southeastern processor output and landings. First, and probably least significant, the National Marine Fisheries Service standard conversions that were used to estimate shrimp processor output on a raw headless shell-on shrimp weight basis may be somewhat liberal, such as for specialty items. This problem, however, is thought to be nil. A second reason for the growing difference between processor output and landings reflects possible transshipments of shrimp among processors. For instance, shrimp which is headed and frozen by one processor and then used by another processor, such as for breading, will be counted twice in the voluntary National Marine Fisheries Service annual survey of seafood processing plants. The extent of counting the shrimp in both an intermediate and more advanced stage of processing is unknown, but may significantly affect estimates of total processed shrimp quantity and value. Most of the growing difference between total processor output and landings, however, undoubtedly represents the increased use of imported shrimp in processing. From Table 1 it is evident that landings provide a maximum of 70-75 percent of the raw material supply needed by southeastern shrimp processors. The remaining 25 to 30 percent is due to imports.

A more detailed breakdown of shrimp processing plant output and landings is given in Table 3. This breakdown is by state in the Gulf Region and for the South Atlantic Region in total. Among Gulf Region states, Florida (Gulf) has historically had the greatest amount of processing plant output relative to landings (Table 3). As noted earlier, Alvarez (1974) documented widespread use of imported shrimp among Florida processors in the early 1970's.

Activities among Alabama and Mississippi shrimp processors in relation to the Gulf Region total were, as indicated in Table 3, relatively small during the early 1970's.

Table 3. Shrimp catch and processing activities in the South Atlantic Region and Gulf Region (by state) in heads-off pounds, 1970-87.

Year	South Atlantic		Florida, Gulf		Alabama		Mississippi	
	Catch	Process	Catch	Process	Catch	Process	Catch	Process
	---------- 1,000 lbs headless (shell-on) ----------							
1970	12,778	22,682	16,735	47,858	9,469	12,394	6,050	11,268
1971	19,344	22,151	13,581	45,731	10,471	8,394	5,927	11,030
1972	15,654	20,390	14,265	38,905	10,959	15,145	4,860	9,705
1973	15,225	20,990	16,321	38,307	7,518	15,493	2,259	7,855
1974	16,796	19,209	17,604	37,760	8,714	13,064	3,319	12,912
1970-74 Average	15,959	21,084	15,701	41,712	9,426	12,898	4,483	10,554
1975	15,454	22,749	17,184	38,697	8,720	13,846	2,424	9,299
1976	16,187	19,511	16,714	51,950	11,700	23,442	4,716	13,360
1977	11,173	19,492	20,650	55,579	15,658	6,830	6,611	20,469
1978	12,486	18,290	18,663	69,449	13,244	30,082	5,193	21,581
1979	20,023	16,969	17,720	70,618	12,520	30,219	5,352	21,917
1975-79 Average	15,065	19,402	18,186	57,259	12,368	24,884	4,859	17,352
1980	20,458	16,546	15,296	48,154	9,508	24,507	3,719	22,142
1981	10,239	17,713	21,555	66,117	13,321	25,215	5,229	24,316
1982	15,860	20,411	13,687	67,011	10,351	32,022	6,362	24,467
1983	16,501	19,932	15,712	58,275	9,712	29,274	6,728	26,702
1984	11,891	18,151	16,869	65,035	11,694	48,674	8,076	30,821
1980-84 Average	14,990	18,551	16,624	60,918	10,917	31,938	6,023	25,690
1985	17,341	21,733	17,396	68,420	12,355	46,525	10,457	33,179
1986	14,334	23,263	15,074	72,634	14,286	52,177	8,159	33,061
1987	14,201	22,513	11,347	49,246	10,660	53,063	7,898	38,240
1985-87 Average	15,292	22,503	14,606	63,433	12,433	50,588	8,838	34 ,827

Table 3. Continued.

	Louisiana		Texas		Gulf Region	
	Catch	Process	Catch	Process	Catch	Process
	---------- 1,000 lbs headless (shell-on) ----------					
1970	57,297	67,573	55,646	65,773	145,198	204,866
1971	58,712	66,499	54,385	67,419	143,076	199,073
1972	52,689	60,545	61,112	71,375	143,885	195,675
1973	37,270	50,144	51,453	60,350	114,821	172,149
1974	37,854	48,234	49,413	49,975	116,904	161,945
1970-74 avg.	48,764	58,599	54,402	62,978	132,777	186,742
1975	34,024	38,002	44,392	34,953	106,744	134,797
1976	52,163	48,286	46,888	46,036	132,181	183,073
1977	66,042	62,180	57,406	47,435	166,367	212,492
1978	66,222	54,793	52,905	48,426	156,227	224,331
1979	50,123	42,140	41,604	36,863	127,319	201,758
1975-79 avg.	53,715	49,080	48,639	42,743	137,768	191,318
1980	56,498	47,015	46,402	40,353	131,423	182,171
1981	71,335	44,234	59,951	52,320	171,391	212,202
1982	57,369	38,909	44,508	35,807	132,277	198,216
1983	48,861	36,856	45,404	49,634	126,417	200,741
1984	68,062	41,375	57,524	47,539	162,225	233,443
1980-84 avg.	60,425	41,678	50,758	45,131	144,749	205,355
1985	74,059	41,106	52,877	44,084	167,144	233,314
1986	93,539	63,338	61,468	44,295	192,526	265,505
1987	74,839	47,655	59,069	49,712	163,813	237,916
1985-87 avg.	80,812	50,700	57,804	46,030	174,494	245,578

Source: The 1970-73 numbers were compiled from United States Department of Commerce, United States Fisheries Statistics and 1974-87 numbers were compiled from unpublished data provided by the National Marine Fisheries Service, Fisheries Statistics Division.

Since 1975, however, processed shrimp production in each of these two states has increased at an extremely rapid rate and is currently several times larger than respective state landings. During 1985-87, average annual shrimp processor output in Alabama, as measured in terms of raw headless, shell-on shrimp equivalent weight was 80 percent of Florida's (west coast) while output in Mississippi was 55 percent of that in Florida. By comparison, 1970-74 shrimp processor output in Alabama averaged only about 30 percent of Florida's, while Mississippi processor output equalled just a quarter of that in Florida.

In contrast to that observed among other Gulf states, shrimp processing activities in Louisiana and Texas have declined significantly during the 1970-87 period (Table 3). Much of the decline in Louisiana's activities may reflect the demise of canning operations in the state. The reason for the decline in processing activities in Texas is much harder to identify but may reflect in part an inability of processors there to secure adequate raw material supplies during the mid-1970's when there was considerable instability in the state's shrimp harvesting sector. Since the mid-1970's, landings in these two states have generally exceeded processor output, often by significant amounts. As noted, Roberts and Pawlyk (1986) found that about a quarter of Louisiana's shrimp harvest was processed in other states, largely Alabama and Mississippi. Some of the Texas harvest may also be processed in these states. While the increased shrimp usage by Alabama and Mississippi processors beginning in the mid-1970's may be tied to the decline in processing activities in Louisiana and Texas, more recent processing advances are likely to be import based.

Shrimp processor output in the South Atlantic states has consistently fallen within the 17-23 million-pound range since the 1970's compared with landings of 11-20 million pounds. The five-year averages in Table 3 suggest that processor output in the region has exceeded landings in the neighborhood of four to seven million pounds.

While import growth is an essential aspect to consider in evaluating the southeastern shrimp processing activities, it is just as important to consider the product mix of these imports and changes of this mix through time. This is because imports of certain shrimp products, such as shell-on, are more compatible with processor raw material needs. Imports of shell-on shrimp can be peeled or peeled and breaded to add value. Peeled imports, on the other hand, are limited primarily to processor use in breading. Canned and breaded shrimp imports represent fully processed products and hence are not utilized by the southeastern shrimp processing sector. Evaluation of import growth of these two processed products is important, however, because they may compete with domestically processed products of the same types.

As indicated in Table 4, shell-on shrimp represent the bulk of U.S. shrimp imports by product-weight. Most remaining imports, based on a product weight basis, are peeled raw. Imports of more processed products, i.e., other peeled (mostly peeled

Table 4. U.S. shrimp imports by product form, 1974-88.

	Product Form	Quantity (1,000 Lb.)	Value ($1,000)	Def. Value[a] ($1,000)
1974	Shell-on	131,962	240,211	162,634
	Peeled Canned	6,107	7,570	5,125
	Peeled Raw & Others	89,889	138,089	93,493
	Breaded	953	1,466	992
	Total	228,911	387,336	262,245
1975	Shell-on	117,247	222,094	137,775
	Peeled Canned	1,118	1,687	1,046
	Peeled Raw & Others	81,902	120,405	74,693
	Breaded	1,190	2,053	1,273
	Total	201,457	346,239	214,788
1976	Shell-on	129,741	293,542	172,165
	Peeled Canned	2,350	2,646	1,552
	Peeled Raw & Others	96,888	165,385	97,000
	Breaded	831	1,771 1,039	
	Total	229,810	463,344	271,756
1977	Shell-on	125,805	295,898	163,029
	Peeled Canned	2,809	3,203	1,765
	Peeled Raw & Others	98,678	191,035	105,253
	Breaded	725	1,393	767
	Total	228,017	491,529	270,815

Table 4. Continued.

	Product Form	Quantity (1,000 Lb.)	Value (1,000)	Def. Value[a] ($1,000)
1978	Shell-on	101,266	241,290	123,548
	Peeled Canned	2,739	3,370	1,725
	Peeled Raw & Others	93,782	176,190	90,215
	Breaded	427	874	447
	Total	198,214	421,724	215,936
1979	Shell-on	123,447	469,857	216,125
	Peeled Canned	4,288	8,230	3,785
	Peeled Raw & Others	96,283	234,084	107,674
	Breaded	486	1,067	491
	Total	224,504	713,238	328,076
1980	Shell-on	138,750	519,217	210,379
	Peeled Canned	4,225	8,063	3,267
	Peeled Raw & Others	76,161	191,588	77,629
	Breaded	172	395	160
	Total	219,308	719,263	291,989
1981	Shell-on	140,952	520,254	190,435
	Peeled Canned	4,383	8,898	3,266
	Peeled Raw & Others	74,430	186,205	68,357
	Breaded	2,995	8,518	3,127
	Total	222,760	723,875	265,740
1982	Shell-on	184,873	750,001	259,426
	Peeled Canned	5,332	10,551	3,649
	Peeled Raw & Others	79,805	205,009	70,913
	Breaded	3,859	14,672	5,075
	Total	273,869	980,233	339,064

Table 4. Continued.

	Product Form	Quantity (1,000 Lb.)	Value ($1,000)	Def. Value[a] ($1,000)
1983	Shell-on	216,950	896,306	300,371
	Peeled Canned	13,176	25,499	8,545
	Peeled Raw & Others	108,618	290,841	97,467
	Breaded	2,685	10,876	3,645
	Total	341,429	1,223,522	410,027
1984	Shell-on	225,696	913,993	293,794
	Peeled Canned	13,580	26,409	8,489
	Peeled Raw & Others	102,901	275,144	88,442
	Breaded	319	804	258
	Total	342,496	1,216,350	390,983
1985	Shell-on	232,642	866,566	272,077
	Peeled Canned	17,088	32,163	10,098
	Peeled Raw & Others	109,578	252,646	79,324
	Breaded	598	1,537	482
	Total	359,906	1,152,912	361,982
1986	Shell-on	262,044	1,080,127	328,906
	Peeled Canned	15,757	29,406	8,954
	Peeled Raw & Others	122,072	323,972	98,652
	Breaded	233	832	253
	Total	400,106	1,434,337	436,765
1987	Shell-on	310,073	1,224,234	359,646
	Peeled Canned	17,132	33,380	9,806
	Peeled Raw & Others	149,889	449,658	132,097
	Breaded	1,211	2,952	867
	Total	478,305	1,710,224	502,416

Table 4. Continued.

	Product Form	Quantity (1,000 Lb.)	Value ($1,000)	Def. Value[a] ($1,000)
1988	Shell-on	358,765	1,337,211	377,423
	Peeled Canned	14,138	28,730	8,109
	Peeled Raw & Others	129,607	386,272	109,024
	Breaded	1,368	2,488	702
	Total	503,878	1,754,701	495,258

Source: United States Department of Commerce, Fisheries of the United States (various issues).

[a] deflated values are based on the 1967 Consumer Price Index

cooked) canned and breaded shrimp, represent only a very small share of total imports.

The mix of shell-on shrimp and other imported products, as indicated in Table 4, was essentially unchanged during the 1974-81 period, with two exceptions. First, a decline in shell-on imports occurred in 1978 but only for that year. Second, a small increase in the shell-on share was evident in 1980 and 1981. Since 1982, however, large shifts in the relative importance of products in the imported category have occurred.

Key changes regarding shrimp processing in the Southeast may be linked to the shell-on and peeled shrimp shares of imports. Peeled raw shrimp imports increased in quantity between 1974-81 and 1982-88. The relative share in the imported product mix, however, decreased from 40 percent to 30 percent. Shell-on product share increased to 66 percent in 1982-88 from 57 percent in the prior period. As identified in Table 4, shell-on shrimp had an increased share of an increasing total quantity of imported shrimp. The result was 358 million pounds of shell-on shrimp by 1988. Canned shrimp doubled its pre-1982 percentage share of all shrimp imports. The share, in spite of doubling, amounted to only about four percent of imports by quantity. Much of the increase in canned imports represents an aggressive program by Thailand to develop its tuna and shrimp canning industries.

Because southeastern shrimp landings are no longer expanding, the region's shrimp processors that sought to capitalize on the increased demand for processed shrimp (see Appendix A for an historical perspective of shrimp consumption in relation to total seafood consumption) through expanding sales had to consider the recent developments in import supply, especially the shell-on. For the nation as a whole, shrimp consumption has grown while processor output grew far less. From the U.S. net export position in canned shrimp, the country became a large importer as Gulf canners exited the business. Since the 1973 level of 112 million pounds, breaded production has been volatile but upward between 1980 and the record high year of 1989 (Vondruska 1990). While it will be seen later in the report that some shrimp processing establishments had a history of using imports, the supplies from farming operations in Ecuador and China, as indicated in Table 2, were only recently available. Marketers in these countries and importers sought new uses of the increasing supply. The post-1982 period became a period of increasing use of imported shrimp by southeastern processing establishments. The information in Table 1 helps to identify this relationship.

While the above discussion helps to depict the potential use of imported shrimp among southeastern shrimp processors, it is far from complete. To obtain a more complete picture of the use of imports in the region's shrimp processing sector, the authors conducted interviews with managers of shrimp companies that are thought to have used and/or that are using imports in processing activities. Interviews with management of 31 shrimp processing establishments (plants) were conducted during the fall of 1988 and the winter of 1989 and provide the information for much of the

Table 5. Processing plants using imported shrimp by state, 1974-88.

Year	South Atlantic		Gulf				
	Florida	Georgia	Florida	Alabama	Miss.	Louisiana	Texas
1974	0	2	5	0	0	1	0
1975	0	2	5	0	0	1	0
1976	0	2	5	0	0	1	0
1977	0	2	5	0	0	1	0
1978	0	2	5	0	0	1	0
1979	0	2	5	0	0	1	0
1980	0	2	5	0	0	1	0
1981	1	2	5	0	0	1	0
1982	1	2	5	1	0	1	0
1983	1	2	5	2	1	2	0
1984	1	2	5	2	2	2	0
1985	1	2	5	4	2	2	0
1986	1	2	5	4	5	3	1
1987	1	2	5	5	7	4	1
1988	1	2	5	5	7	5	1

Source: Primary data collected by authors.

ensuing discussion. Because a small number of southeastern shrimp processors were either not identified or declined to be interviewed, the estimates provided below may be low. Also, managers of those companies which ceased processing operations prior to this study could not be contacted, and this suggests that information gathered on the earlier years is especially incomplete.

As Table 5 documents, at least 26 establishments were using imported raw material by 1988. A noteworthy aspect of the historical use is the lengthy, uninterrupted usage pattern among Florida Atlantic coast, Georgia, and Florida Gulf coast processors. The year 1982 was the benchmark for other states' experiences. Alabama, Mississippi, and Louisiana processing industries experienced a large increase in the number of plants that use imports. Among the three states, companies in Alabama began using imports earlier. By 1988, however, the number in Mississippi exceeded the number in Alabama. The number in Louisiana matched that of Alabama by 1988. However, many of the Louisiana companies indicated a much more seasonal basis of import usage than did the companies in Alabama and Mississippi.

The relative importance of imports was identified by comparing the region's total production of processed shrimp and the estimated production of plants that use imported shrimp as raw material, as shown in Table 6. By 1984, the plants that use imports accounted for 56 percent of the region's total processed shrimp output. In the initial year, 1974, they accounted for 31 percent of the total. The estimated use of imported shrimp increased five fold, from 8-9 million pounds in 1974-75, to 50 million pounds by 1986-87. By 1987, imported shrimp accounted for 36 percent of production among companies using imported shrimp compared with 14 percent in 1974.

It is worth noting that import usage among companies surveyed is significantly less than one might expect based on the information provided in Table 1 (49 million pounds in 1985-87 from Table 6 compared with a difference between processed output and landings of 79 million pounds from Table 1). While the survey conducted by the authors did not account for all import usage among processors, especially in earlier years, (this is because managers of a few companies declined being interviewed and it was impossible to interview managers of companies which had ceased processing operations) it is the opinion of the authors that a significant amount of total import usage among southeastern shrimp processors for the 1974-88 period was collected, especially in the later years. This indicates that some of the difference between the region's processed production and landings, as reported in Table 1, may reflect double counting of shrimp as it goes from an intermediate level to a more highly processed product.

The significance of imports to processing plants in the region could also manifest itself through their product mix. Shrimp products were identified in our survey as raw headless shell-on, peeled raw, breaded, and other. Shrimp that are canned, peeled cooked, or dried comprise most of the "other" category. Plants using imported shrimp more than doubled their production during 1974-87, as measured on a raw

headless shrimp equivalent weight basis (Table 6). The shell-on, raw peeled, and breaded categories exhibited large quantity increases among processors of imported shrimp (Table 7). By contrast, the other plants in the region experienced growth in only the raw peeled shrimp category during 1974-87 (Table 8). Their breaded shrimp production decreased by approximately 40-50 percent. It is noteworthy that the raw shell-on category was a significant growth category for import-using processors during 1974-87 when non-import users had no growth in that category. Use of imported shrimp in the raw shell-on category does not necessarily indicate lack of value added in processing. Processors using imports responded to the usage question concerning their product mix by including repacked shrimp in the raw shell-on product category. In particular, farm-raised shrimp from Ecuador was repacked as raw shell-on product. Other farm-raised shrimp likely to be repacked as shell-on product included shrimp from Taiwan. White shrimp from mainland China were prominent in 1986 and 1987 U.S. imports. The major uses of this supply included peeled raw and repacking.

Table 6. Processed shrimp products in the Southeast region and estimates of imported shrimp's role, 1974-87.

Year	Processed Quantity (mils. lbs., headless, shell-on) A. Total for All Plants	B. Total Output of Plants Using Imports	Percent (B/A)	Imported Shrimp Used	Percent Imports Used By Plants
1974	181	57	31	8	14
1975	157	56	36	9	16
1976	203	74	36	14	19
1977	232	83	36	16	21
1978	243	93	38	22	24
1979	219	82	37	23	28
1980	199	64	30	16	25
1981	230	93	47	29	31
1982	219	99	43	31	31
1983	221	92	42	27	29
1984	252	124	56	38	31
1985	255	131	52	44	33
1986	289	158	55	53	33
1987	260	137	53	49	36

Sources: Compiled from primary data collected by authors and unpublished data provided by the National Marine Fisheries Service

Table 7. Shrimp products of southeastern establishments using domestic and imported shrimp as raw material, 1974-87.

Year	Raw Shell-on	Peeled Raw	Breaded	Other	Total
	-------- mil. lbs. heads-off (shell-on) ------				
1974	15.7	10.2	23.8	7.7	57.0
1975	17.9	8.7	24.8	4.9	56.3
1976	24.8	11.8	29.9	8.0	74.5
1977	28.9	13.1	33.4	7.8	83.2
1978	30.5	17.8	39.0	5.6	92.9
1979	24.1	20.2	34.4	3.6	82.3
1980	17.9	10.2	29.5	6.8	64.4
1981	30.5	10.3	33.0	19.8	93.6
1982	26.6	26.4	36.5	9.4	98.9
1983	25.4	19.8	35.1	11.7	92.0
1984	45.7	21.4	39.0	18.6	124.7
1985	43.8	30.1	39.0	18.1	131.2
1986	59.1	41.7	44.8	12.4	158.0
1987	43.4	44.8	41.2	7.3	136.7

Sources: Compiled from primary data and unpublished data provided by the National Marine Fisheries Service, Fisheries Statistics Division

Table 8. Shrimp products of southeastern establishments using only domestic shrimp as raw material, 1974-87.

Year	Raw Shell-on	Peeled Raw	Breaded	Other	Total
	---------- mil. lbs. heads-off (shell-on) ----------				
1974	52.1	16.8	26.1	29.0	124.0
1975	39.6	17.0	24.6	20.0	101.2
1976	62.2	22.6	17.7	26.0	128.5
1977	83.8	22.0	14.0	29.2	149.0
1978	80.8	30.0	15.0	24.2	150.0
1979	66.3	38.0	14.2	17.9	136.4
1980	61.1	33.3	13.5	26.3	134.2
1981	68.5	36.0	12.0	19.9	136.4
1982	58.5	38.0	12.0	11.5	120.0
1983	61.0	39.0	13.4	15.4	128.8
1984	61.1	41.0	12.1	13.0	127.2
1985	60.8	42.2	12.3	8.3	123.6
1986	59.9	49.0	12.1	9.7	130.7
1987	49.6	49.5	15.0	9.7	123.8

Sources: Compiled from primary data and unpublished data provided by the National Marine Fisheries Service, Fisheries Statistics Division.

SHRIMP PROCESSING - STRUCTURAL CHANGE

Growth in total production of shrimp by southeastern processors has been increasingly linked to imported shrimp supplies as just shown. Also, the product mix is affected. Establishments using imports experienced increasing production of shell-on, peeled raw, and breaded shrimp. Processors using only U.S.-landed shrimp increased only their peeled production and experienced no growth in total production. Such diverse trends justify the evaluation of data for evidence of structural changes in the region's shrimp processing industry.

When Keithly et al. (1988) evaluated regional trends in Gulf of Mexico shellfish processing, some structural changes were identified through 1985. For the 1970-85 period the average five-year entry ratio was 57 percent, while the exit rate was 60 percent. This means that 57 percent of the average number of shrimp processors in the business during the period were new entrants. Conversely, 60 percent of the average number exited for a net decrease in the number of establishments. Only 45 of the establishments processing shrimp in 1985 were also in business during 1970. The addition of shrimp establishment data for the South Atlantic states should not significantly change the findings.

Table 9 indicates a reduction in number of southeastern shrimp processing plants during 1974-87, especially after 1983. The quantity of shrimp products increased at an annual average rate of 2.8 percent. The value increased to just over $1 billion by the period's end, growing at a 9.4 percent rate. Inflation, however, was responsible for much of the value increase. Removing the effects of inflation lowered the growth rate to 2.6 percent. The growth in real, deflated, value then was slightly less than the growth rate of production. It is noteworthy that the deflated value of shrimp products processed in the Southeast was higher during the 1977-79 period than in more recent years, despite the rise in poundage.

Evaluation of the production and value trends for differences between import users and non-user establishments was undertaken. Differences in raw material procurement could be a characteristic of the industry that affects competition. Import users increased shrimp output from 57 million pounds to 137 pounds (Table 10). This growth when calculated annually was seven percent. Establishments not using imports had 124 million pounds of product in both 1974 and 1987. By 1984 import users' production had become almost half the total shrimp processed in the Southeast. Non-user establishments failed to maintain their relative share of the region's production of processed shrimp. The number of establishments involved in this competitive approach to stability in landings began increasing at that point and nearly doubled by 1988 (Table 5). The resurgence of growth in import use by southeastern processors in 1984 was simultaneous with the initiation of the sustained import expansion (Tables 1 and 6). All of the new adopters of the procedure were in the Gulf states.

In terms of processed value the non-users of imports did increase sales by an average of $19 million per year in 1974-87 (Table 10). The import user group of establishments increased sales by $34 million annually. Removing inflation by a common factor would not change

Table 9. Southeastern shrimp processing establishments: number, total shrimp product, quantity and value, 1974-87.

Year	No.	Quantity (mil. lbs.)	Value	
			Current	Deflated[a]
			($ mill.)	
1974	179	181	315	213
1975	164	157	338	209
1976	166	203	535	314
1977	171	232	609	336
1978	171	243	691	354
1979	173	219	809	372
1980	171	199	690	280
1981	167	230	809	297
1982	168	219	921	319
1983	171	221	940	315
1984	154	252	969	312
1985	147	255	935	294
1986	153	289	1,106	337
1987	151	260	1,015	298

Source: Compiled from United States Department of Commerce, Fisheries Statistics of the United States and unpublished data provided by the National Marine Fisheries Service, Fisheries Statistics Division.

[a] deflated values based on the 1967 Consumer Price Index

Table 10. Quantity and value of southeastern processed shrimp products, import users and non-import users, 1974-87.

Year	Quantity (mil. lbs. headless)		Value (mil. $)	
	import users	non-users	import users	non-users
1974	57	124	113	202
1975	56	101	130	208
1976	74	128	209	326
1977	83	149	240	369
1978	93	150	264	427
1979	82	136	322	487
1980	64	134	258	432
1981	93	136	353	456
1982	99	120	443	478
1983	92	129	434	506
1984	124	127	519	450
1985	131	124	502	433
1986	158	131	632	474
1987	137	124	562	453

Source: Compiled from primary data collected by authors and unpublished data provided by the National Marine Fisheries Service, Fisheries Statistics Division.

the fact that the import user segment of the region's industry grew at almost twice the rate of the non-user segment.

The upward trend in imports and in number of processors using imports may have introduced a new competitive element into the region. Quantity and sales growth rates for import-using establishments were larger than those of non-users (Table 10). Consequently, one might have expected the market shares in the new competitive situation to have changed during the 1974-87 period. The concentration of processed shrimp sales among the top 5, 10, 20, and 50 establishments was computed to determine the situation. A comparison of value statistics for southeastern shrimp processing establishments revealed minimal change in concentration of sales (Table 11). The top five establishments in 1974, 1979, 1984, and 1987 represented from 27 to 31 percent of regional sales. The top ten establishments exhibited movement in a similarly narrow range of 44 to 50 percent. From 1974 to 1984 the share by establishment groupings was essentially unchanged, although each of the four groupings controlled a slightly lower percentage of regional sales after 1984. The surge of shrimp imports from countries with emerging aquaculture industries occurred at that point.

The possibility of linkage between the farm-raised import increase and the decrease in concentration was examined. Sales of shrimp products from import users in each of the four years were identified. The import users were found to be more prevalent in the top 5, 10, 20, and 50 establishments beginning in 1984 and continuing into 1987 (Table 12). By 1987 the import users comprised half of the top 50 establishments in terms of sales. Seventy percent of the top 10 establishments used imported shrimp by 1987, compared to 30 percent in 1979. Of the 31 import-using establishments completing at least part of the questionnaire during the personal interview process, 25 were among the 50 largest sellers. That is, 81 percent of the import-using establishments were among the 50 largest of the region's 151 establishments (Table 12).

Another perspective on the market concentration is the sales percentage of the importing establishments. The last two columns of Table 12 identify import user sales and percentage share of each concentration category. For example, in 1974 the two establishments using imports accounted for 49.5 percent of top 5 establishment sales. The import users' share of value for each category had increased substantially by 1984. Importing establishments had achieved the majority of each category's sales by then. Further consolidation of their market shares occurred as a result of the increasing availability of imports after 1984 (Tables 12, 1, and 4). The calculated shares for 1987 indicate that over 60 percent of each category's sales were accounted for by import-using establishments. Most notable in the estimates is that 25 import-using establishments accounted for 61 percent of sales for the top 50 establishments. The top 50 establishments in the region commanded an 87 percent market share (Table 11). Just half of these 50 were import users but account for 55 percent of all sales (Table 10).

One additional element of market structure that may influence competition among the region's processors is the entry and exit pattern of import users. Overall, shrimp processing establishments in the region were previously shown to have exhibited a high level of entry

Table 11. Concentration of southeastern shrimp processing establishment sales, 1974-87.

Year	Category*	Quantity[a] (mils. lbs.)	Value (mils. $)	Share of Value %
1974	n= 5	62.1	97.7	31
	n=10	88.6	145.2	46
	n=20	120.7	207.1	66
	n=50	155.8	275.3	87
1979	n= 5	71.8	243.6	30
	n=10	110.4	385.8	48
	n=20	154.0	558.6	69
	n=50	198.1	740.6	91
1984	n= 5	72.7	302.3	31
	n=10	116.7	480.9	50
	n=20	170.0	668.4	69
	n=50	227.0	887.2	91
1987	n= 5	68.8	274.6	27
	n=10	116.6	452.0	44
	n=20	163.8	636.2	63
	n=50	229.3	888.3	87

* The category designation was based on sales of all regional establishments.

Source: Compiled from unpublished data provided by the National Marine Fisheries Service, Fisheries Statistics Division.

[a] given on a headless shell-on basis

Table 12. Concentration of import-using establishment sales for southeastern shrimp processors, 1974-87.

Year	Category*	Importing Establishment: Import Users (no.)	Quantity (mil. lbs.)	Value (mil. $)	Share of Category Value (%)
1974	1	2	29.5	48.4	49.5
	2	4	40.5	68.6	47.2
	3	6	44.9	79.8	38.5
	4	12	51.4	94.5	34.3
1979	1	2	41.6	125.7	51.6
	2	3	48.1	154.5	40.0
	3	8	76.8	256.0	45.8
	4	12	80.6	274.6	37.1
1984	1	3	51.5	205.0	67.8
	2	5	71.0	285.6	59.4
	3	11	102.4	401.6	60.1
	4	20	123.2	476.2	53.7
1987	1	3	44.5	180.6	65.8
	2	7	84.1	325.3	72.0
	3	13	112.6	434.1	68.2
	4	25	140.2	543.8	61.2

* The category designation was based on sales of all regional establishments: 1 = top 5 establishments, 2 = top 10, 3 = top 20, 4 = top 50.

(Table 11). Just half of these 50 were import users but account for 55 percent of all sales (Table 10).

One additional element of market structure that may influence competition among the region's processors is the entry and exit pattern of import users. Overall, shrimp processing establishments in the region were previously shown to have exhibited a high level of entry and exit (Keithly et al., 1988). The stability of establishments using imports appears to be high. Sixteen of the 31 establishments using shrimp imports during 1974-87 were in business throughout the period (Table 13). There were no establishments from the sample that exited after 1980. One establishment processed continuously until 1987 when it exited. Two other establishments

discontinued processing (exited) in 1980 but began shrimp processing again in 1981. One of these establishments in turn discontinued processing in 1983 to then follow in 1984 with re-entry as a shrimp processor. The general conclusion is that those southeastern establishments sampled having a history of import shrimp usage are a more stable element of the industry.

Table 13. Southeastern shrimp processing establishments that used imported shrimp at least one year during the period 1974-87.

Year	Total	Number of Establishments			
		Exit	Re-entry	Re-exit	Re-entry
1974	16	1(1987)			
1975	16				
1976	17				
1977	18	1(1980)	1(1981)		
1978					
1979	19	1(1980)	1(1981)	1(1983)	1(1984)
1980	18				
1981	21				
1982	22				
1983	23				
1984	24				
1985	25				
1986	26				
1987	27				

Source: Primary data collected by authors

Appendix A

Per capita consumption of seafood in the United States has risen sharply in recent years (Table A). The 15.2 pounds (edible weight) consumed per person in 1988 represents a 22% increase above the 12.3 pounds exhibited in 1982.

Increased per capita consumption of shrimp, as indicated in Table A, accounts for about a third of the total increase in per capita consumption of seafood in the United States. Consumption of it increased from 1.5 pounds per capita in 1982 to 2.4 pounds in 1988. As a percentage of total seafood consumed on a per capita basis, the share represented by shrimp increased from 12% in 1982 to 16% in 1988.

Table A. U.S. per capita seafood and shrimp consumption, 1982-88.

Year	Seafood (lbs.)	Shrimp (lbs.)	Shrimp (%)
1982	12.3	1.5	12
1983	13.1	1.7	13
1984	13.7	1.9	14
1985	14.4	2.0	14
1986	14.7	2.2	15
1987	15.7	2.4	15
1988	15.2	2.4	16

Source: United States Department of Commerce, Fisheries of the United States.

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