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**SHRIMP PROCESSING IN THE SOUTHEAST:  
SUPPLY PROBLEMS AND STRUCTURAL CHANGE\***

Fred J. Prochaska and Chris O. Andrew

A growing deficit in shrimp landings relative to processing needs in the Southeast Region<sup>1</sup> of the United States concerns both industry and government officials. Structural changes in the shrimp industry are encouraged by the growing supply deficit. The shrimp supply situation and resulting industry organization changes are the primary concerns of this paper.

**THE SUPPLY DEFICIT**

Seafood processing is an important source of income and employment in the Southeast Region of the United States. The wholesale value of processed seafood products in the Southeast Region exceeded \$415 million in 1970, accounting for approximately 27 percent of all United States seafood processing.<sup>2</sup> In the Southeast, 1,249 seafood wholesaling and processing firms employ 18,734 persons on a year-round basis, and employment reaches approximately 26,000 during the peak processing season. Within this region Florida is the leading seafood processing state with over \$112 million of processed seafood products in 1970. Louisiana ranked second and Texas third in 1970, with the value of processed products at \$102 million and \$89 million, respectively. The remaining states, Georgia, Mississippi, Alabama, North Carolina and South Carolina, processed \$34, \$33, \$21, \$13, and \$11 million, respectively.

Shrimp products were valued at \$262 million and are by far the most important seafood product processed, accounting for more than 63 percent of the value of all seafood processing in the Southeast Region in 1970. During the same year this region was responsible for 74 percent of all shrimp products processed in the United States.

From 1967 to 1971 shrimp landings in the Southeast averaged 242.2 million pounds per year. These landings account for 72 percent of all United States shrimp landings; however, in spite of this volume, the region was deficient in supplying its own raw shrimp for processing. Shrimp processors utilized approximately 35 percent more shrimp (converted to live weight) than was landed in the region in 1970. Dependence on raw shrimp from outside the region for processing has increased since 1960 when the volume of landings approximately equaled the volume of processed products.<sup>3</sup>

Dependence on outside sources of shrimp supplies is even more serious for some states than for the region as a whole. Only two of the states, North Carolina and South Carolina, land more shrimp than are needed for their processing industries; however, these states are marginal in both landings and processed products when compared to the remaining states. Louisiana, Texas, Alabama, Mississippi, Florida, and Georgia fishermen supply less than 97

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<sup>1</sup>The Southeast Region includes the following coastal states of the South Atlantic and Gulf fishery regions: Texas, Louisiana, Mississippi, Alabama, Florida, Georgia, South Carolina, and North Carolina.

<sup>2</sup>The 1970 statistics on processing by specific products and states are the latest available. Unless otherwise noted, statistics used herein are based on [2] and [5].

<sup>3</sup>These estimates represent the maximum raw product the region or state supplied its processors. Some raw shrimp landed within the state or region is processed outside the state, or is consumed fresh. In addition, pounds of specialty shrimp products could not be converted to raw product equivalents for this analysis.

percent, 84 percent, 76 percent, 57 percent, 35 percent, and 28 percent, respectively, to their processors. In terms of processing, Texas and Florida are of approximately equal importance, yet, Florida's deficit of raw product is much more critical.

The serious deficit supply position of the Southeastern Region raises several important researchable questions, some of which are not analyzed in this paper. First, the economic feasibility of locating processing firms in the Southeast is questionable. The Southeast Region plus the inland border states consume approximately 37 percent of shrimp consumed in United States homes [3]. If shrimp consumption in the Southeastern institutional market is a similar percent of the United States total, then regional consumption is approximately one-half of regional processing.

Originally, the industry may have located in the Southeast because of abundant raw product supplies; now economies of scale and/or a relative abundance of labor complement the location advantage relative to domestic supply and help offset any transportation diseconomies relative to foreign supplies. Thus, shrimp processors remain attracted to locations in the Southeast. Further research is needed to better understand and determine potential location adjustments within the United States shrimp processing industry.

Second, the economic growth potential of the processing industry in the Southeast depends on competition for raw products produced outside the area. Most of the raw products required by processors to meet the supply deficit must be obtained from foreign imports, since the United States is a net importer of shrimp products. There is a concern for the competitive position of United States as well as Southeastern processors in the international shrimp market. World catches of shrimp are now nearing the maximum sustained yield by some estimates. This will mean stiffer competition for raw product supplies from foreign countries with rapidly expanding demands (including the effect of the devaluation of the dollar) for shrimp such as Japan and the European Common Market.

A third and related question concerns the impact on the market structure (and the resulting conduct and performance) of the shrimp processing industry within given states caused by the growing dependence on an external supply. This problem will be addressed with particular reference to Florida. Florida's shrimp industry permeates the entire Southeastern shrimp industry in such a manner that many of the implications of this study apply to the remaining processing states in the Southeast.

## **STRUCTURAL CHARACTERISTICS AND RELATED SUPPLY PROBLEMS**

There has been substantial growth in the value of shrimp products processed in Florida. Currently, the volume of processed shrimp in Florida is approximately \$80 million. Since the early 1960's processed shrimp products more than doubled in volume and tripled in value which accounted for nearly all the growth in Florida's seafood industry. During the same period Florida suffered approximately a 35 percent decline in landings and moved from a 3.9 million-pound surplus in 1960 to a 64.7 million-pound deficit in 1970. Florida's growing dependence on imported shrimp (United States and foreign) causes concern about its future as a seafood processing state.

### **Structural Characteristics and Change**

The shrimp industry is characterized by two interrelated classes of firms. Some fit both classes, depending upon the degree of vertical integration. Processors peel and devein, bread, and prepare various specialty shrimp products. Handler-processors deal in green headless shrimp and act as assemblers, packers, and wholesalers for processors, retailers, and institutional outlets. These handlers often span the entire industry from shrimping activities to final sales.

Type of ownership currently does not affect market shares in either purchasing or sales. Historical patterns of ownership are not available from secondary data. Currently primary data show that 69 percent of the firms are individual corporations while 25 percent are corporations which are branches or divisions of parent corporations. Forty-five percent of the individual corporations are family-owned. Of the remaining firms, 6 percent are partnerships. All handler-processors included in the study are family-owned corporations.

Shrimp handling and processing in Florida represents an output expanding industry, yet firms are continually withdrawing from the industry at a rate in excess of new entrants. Lack of demand for shrimp products and excessive processing difficulties don't appear to be responsible for this trend. The retail market is strong, and most processors indicate they can market all the shrimp that they can buy and process. Capital and labor requirements don't appear to be restrictive considering that entry into the industry has been common. Supply of raw product, the remaining factor, appears to explain past changes in the industry and probable future changes. The following comments about changes in entry and exit of firms, growth and contraction of firms, and

**Table 1. ENTRY AND EXIT OF FIRMS IN THE FLORIDA SHRIMP INDUSTRY, 1959-1971\***

Year	Handlers			Processors			All Firms		
	Total	Entry	Exit	Total	Entry	Exit	Total	Entry	Exit
1959	36			16			52		
		2	0		1	2		3	2
1961	38			15			53		
		1	6		3	3		4	9
1963	33			15			48		
		3	7		7	2		10	9
1965	29			20			49		
		6	5		3	2		9	7
1967	30			21			51		
		2	4		2	4		4	8
1969	28			19			47		
		4	8		0	2		4	10
1971	24			17			41		
TOTALS		18	30		16	15		34	45
Average	31.1	3.0	5.0	17.6	2.7	2.5	48.7	5.7	7.5
Rate of change		9.6	16.1		15.3	14.2		11.7	15.4

\*Source: Computed from data presented in [1]. A cursory review of those firms not included suggests that those included are representative of the industry.

industry concentration ratios appear to be closely aligned with the competition for and the supply of raw shrimp.

#### Entry and Exit Trends

The shrimp industry in Florida is characterized by numerous firms entering and exiting (Table 1). From 1959 to 1971 a total of 49 and 32 firms were involved in handling and processing, respectively. Over that same period there was an average of only 31 firms in handling and 18 firms in processing. This structural characteristic occurred because 18 firms entered shrimp handling while 30 went out of business, and 16 new firms began processing with 15 ceasing production. The average biannual entry rate for handlers was 9.6 percent and 15.3 percent for processors. Exit rates were 16.1 percent and 14.2 percent for handlers and processors, respectively. Only 8 processors of the 32 and 15 of 49 handlers were in business for the entire period.

When employment is used as a proxy for firm size,<sup>4</sup> firms leaving the industry were smaller than

those entering [1]. From 1959 to 1971 firms leaving processing employed an average of 97.8 people during the last year of operation, while entering firms employed 110.9 people during the first year of activity. Five firms, or 16 percent of the firms processing from 1959 to 1971, operated for only one year and employed an average of 36.6 people. Minimal differences prevailed in employment between firms leaving (16.3 employees) and entering (17.1 employees) shrimp handling.

#### Firm Size Trends

Changes in firm size have been prominent in the industry. For those firms neither entering nor leaving the Florida shrimp industry since 1959, an average of 14.5 percent of the processing firms were growing and 11.8 percent were declining in employment (Table 2). Size changes in shrimp handling firms were very sluggish relative to processors, in that 3.7 percent grew while 4.7 percent were declining on the average. Thus, 26.3 percent of the processing firms were changing in size while 8.4 percent of the

<sup>4</sup> Employment is used because production time series data are unavailable. Cross section data from 1972 taken from the Florida shrimp processing industry, however, indicate that employment is a good proxy for firm capacity and output. All three of these measures classify firms in the same small, medium, and large categories for market concentration analysis. This is due primarily to the high labor intensity in the industry. Labor-saving technology would influence firm size and exit conditions, but major technological advances were made over the 10-year period.

**Table 2. FREQUENCY OF FIRM SIZE (EMPLOYMENT) CHANGES IN THE FLORIDA SHRIMP INDUSTRY, 1959-1971\***

Year	Handlers					Processors			
	Total <sup>a</sup>	Inc.	Dec.	Same		Total	Inc.	Dec.	Same
1961	36	0	1	35	:	14	0	1	13
1963	32	1	1	30	:	12	0	2	10
1965	26	1	1	24	:	13	4	2	7
1967	24	2	1	21	:	18	2	2	14
1969	26	1	0	25	:	17	3	2	12
1971	20	1	4	15	:	17	4	2	12
Average	27.3	1	1.3	25		15.2	2.2	1.8	11.2
% of total average		3.7	4.7	91.6			14.5	11.8	73.7

\*Source: Computed from employment data presented in [1].

<sup>a</sup>Firms entering and exiting are excluded to account for the difference between Tables 1 and 2.

handlers were either expanding or decreasing. When combined with the entry and exit activity, 35.9 percent of processing firms and 19.6 percent of handling firms were either changing in size or moving into or out of the industry.

#### Firm Concentration Trends

Concentration ratios were developed for the Florida shrimp industry from the secondary data reporting numbers of employees in each firm from 1959-1971. Employment has steadily increased since 1959 in both processing and handling and, in general, employment per firm has also grown to keep pace with the increasing trend in total shrimp output. Employment for the industry grew from about 2,000 in 1959 to 2,800 in 1971 with about 80 percent of the employees in processing and 20 percent in handling.

The shrimp industry has become more concentrated since the late 1950's. The five largest processing firms in each of the two-year intervals measured from 1959 to 1971 grew from 74 percent of total labor employed in the industry to about 91 percent and the two largest firms increased from 39 percent to 60 percent.<sup>5</sup> Preliminary estimates from a Florida survey currently being completed for 1972 production lend further support to these findings. Competition in the processing industry is emphasized by noting that four of the firms classified at least once among the top five from 1959 to 1971 went out of business during the period, and one that was in the

top two ceased activity. The five largest handlers grew from 48 percent to 66 percent of employment in the same time period, and the two largest grew from 24 percent to 37 percent.

#### SUPPLY PROBLEMS AS A BASIS FOR STRUCTURAL CHARACTERISTICS

The supply of raw shrimp for processing has been shown to be deficient for the Southeast region and most states therein. A deficit supply to an area can be expected to have differential effects on individual firms, depending on the distribution of the area supply to those firms. If each firm has "equal" access to local supplies as well as to imports from outside the region, the supply deficit alone will not affect the market organization characteristics such as firm concentration. However, if individual firms are not affected "equally," either by chance or purposeful conduct, then the structure of the industry will be affected. We have noted high concentration within the shrimp processing industry and substantial entry and exit. The purpose of this section is to discuss the relation between the supply deficit and the market structure characteristics and changes discussed above. Some aspects of market conduct and performance are also considered.

All firms are not affected equally by the supply shortage. Primary data collected for the Florida shrimp processing study show the largest firms to have, at minimum, informal yet binding agreements with local suppliers. These agreements give a few

<sup>5</sup>Higher productivity per worker in large firms, if prevalent, would tend to make these concentration estimates conservative.

firms control over a substantial proportion of local landings. This in turn can lead to market advantages (increased bargaining power) similar to advantages attributed to "tapered integration" [4]. Preliminary results show 10 percent of the firms to control about 50 percent of Florida landings processed in Florida, thus creating an imperfectly competitive raw product market.

Interdependent relationships between concentration in processing and supply control in the shrimp industry are apparent, yet causality is difficult to establish. Concentration of output may be due to supply control exercised by a few large firms, or supply control may result from market conduct by firms in an industry where the market structure is highly concentrated. Regardless of causality, there is a probability that there will be more concentration in the future as a result of local supply shortages along with supply control by large firms.

Buying power theoretically results in pecuniary economies of scale. In Florida, firms controlling substantial amounts of local supply pay 30 cents per pound less for raw products than the remaining processing firms in the industry.<sup>6</sup> These remaining small competitors pay both a higher price for Florida supplies and for imports, domestic and foreign. In addition to price, the most critical problems indicated in the survey by these small firms were transportation because of their small volume, physical availability of raw products, and foreign competition.

Some small firms have been able to circumvent their competition problems by vertical and/or horizontal integration and by producing specialty products. A few relatively small firms are vertically integrated into shrimping. Generally, these firms also have integrated forward into processing of the type defined for handler-processors in this paper. These primarily are old established firms that have managed to remain profitable as a result of their vertical integration and will be affected only marginally by supply deficits when they must buy a limited amount from independent shrimpers. Potentials for growth of these small firms appear to depend on expansion of their fleets rather than purchases from non-contracted independent shrimpers. These firms are small with respect to the shrimp processing industry but are relatively large as shrimping firms. Capital does not appear to be limiting, considering

that vessel expansion (number and capacity) is presently underway or planned.

Other characteristics of successful small firms were noted. Some firms tended to be horizontally integrated into seafood products other than shrimp, thus making them less vulnerable due to their diversification. Still others produced shrimp specialties which require substantial amounts of labor inputs in preparing the raw products for processing. These specialty firms prefer preprocessed foreign raw products as inputs for final processing because of the relatively lower foreign labor costs compared to labor costs when raw product preparation is done in the United States. Thus, these firms are not affected directly by the local shrimp supplies.

Another aspect of conduct affected by market structure is pricing policy. Survey responses indicate raw product price leadership by the few large dominant firms. Smaller firms generally inquire about prices paid by the large processors for local supplies and pay accordingly. Larger firms, however, do not have excessive liberty in setting prices due to the national and international nature of the market. Many small firms depend on larger firms in pricing policies because of an assumed superior knowledge of market conditions by larger firms. Price leadership appears substantially less on the selling side because of the advanced brokerage system generally employed in the seafood industry. Larger Florida firms tend to be vertically integrated forward to some degree into sales by having sales agents under contract in the major markets.

Average market prices received for the aggregate of all shrimp products by the few larger firms are considerably lower than those received by smaller firms. For all products, large firms receive an average of \$1.59 per pound while smaller firms received \$1.72 per pound. Gross marketing margins<sup>7</sup> for the two groups of firms are relatively close (65 and 63 cents per pound for large and small firms, respectively) even though the smaller firms pay \$.30 per pound more for raw shrimp products and receive only an average of \$.13 per pound more for finished products. This is because the net gain in weight from raw to finished product for small firms is 28 percent while it is only 23 percent for larger firms.

Gross margin and selling price comparisons are not affected when specialty product firms are

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<sup>6</sup> The price differentials are not necessarily meant to imply "raw bargaining power" in the sense of monopsonistic competition. Lower prices to larger firms may be justified due to savings in volume buying, contractual coordination, contractual arrangements resulting in capital availability for suppliers, risk reduction for suppliers, etc. No evidence of formal volume discounts was identified in this phase of the market research. An in-depth study will be necessary to detail the reasons for pricing differentials even though it appears that this information is not available on a quantifiable basis.

<sup>7</sup> Gross margin is computed by dividing total sales revenue by pound of raw shrimp purchased.

excluded from the analysis because these products are relatively unimportant in the Florida processing industry. It is impossible to compute precise gross margins by type of product, since the raw product purchased cannot be traced to individual finished products (except for highly specialized firms) because of industry accounting procedures. When industry raw product equivalent conversion factors are used to approximate gross margin differences between large and small firms, breaded shrimp margins for larger firms exceed those for smaller firms, while the opposite is true for peeled and deveined products. However, in the case of peeled and deveined shrimp, a large volume of small shrimp for one of the large firms and an exceptionally large volume of large preferred Florida pink shrimp for one small firm explain the difference in margins.

Lower selling prices by larger firms may reflect economies, pecuniary or technical, and thus may explain some of the exits of smaller firms from the industry. Small firms, paying higher raw product prices and operating at margins equivalent to those of larger firms, can do so by less product loss in processing, greater technical economies, larger gains in product weight (such as breeding materials), higher selling prices and/or lower profit margins. The first two possibilities don't seem likely because these economies are usually associated with larger firms. Gains in product weight for specified products are governed by federal regulations and thus are not

likely to be substantially greater for small firms. Prices received by smaller firms are higher but not sufficient to offset buying prices; thus, profits are likely to be lower for smaller firms. These considerations may offer additional explanations of exits of smaller firms from the industry.

Finally, new firms entering the industry face serious competition from established firms with relatively low selling prices and secure supplies of raw shrimp products for processing. This competition causes many entering firms to experience short lives in the industry. In fact, both processors leaving the industry between 1969 and 1971 had only entered the industry in the previous time period and were considerably smaller in size than the dominant firms.

### SUMMARY AND CONCLUSIONS

The Southeast is deficient in supplies of raw shrimp to shrimp processors in the region. Analysis of processing in the leading state, Florida, shows changes in the market structure to be associated with changes in raw product supply conditions. Assuming the supply deficit does not ease, further concentration in the shrimp processing industry is expected. Success by small firms in the industry probably will result from specific market behavior conditions, including vertical integration, horizontal integration into other seafoods, and production of specialty products. Further study is underway to assess more fully the effects of the shrimp supply problem on the structure, conduct and performance of the industry.

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