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Analysis of Egypt's Rice Marketing System

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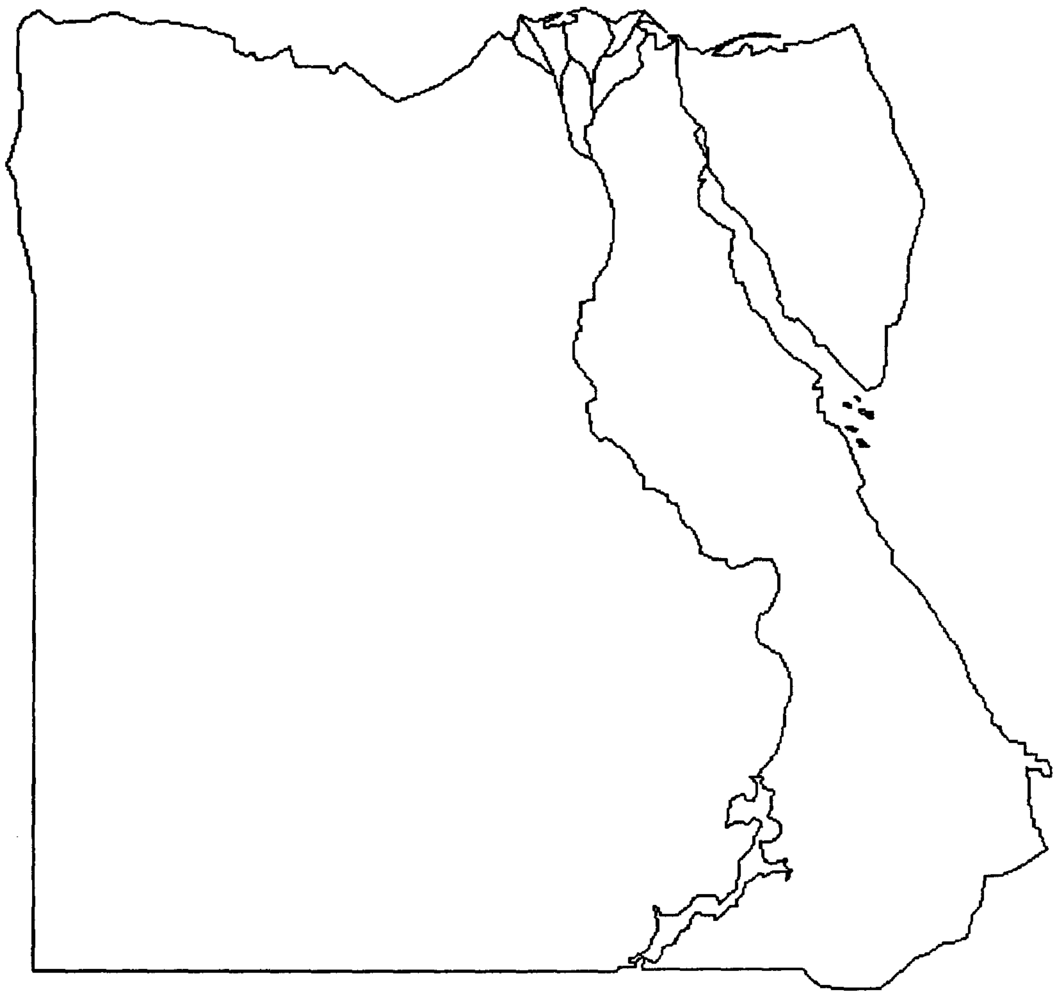

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ANALYSIS OF EGYPT'S RICE MARKETING SYSTEM

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ANALYSIS OF EGYPT'S RICE MARKETING SYSTEM

1.0 EXECUTIVE SUMMARY

Market reforms in Egypt's rice sector have led to a surge in rice production as market returns to farmers moved to world price levels, a rapid increase in the number of market participants, especially private rice dealers, a sharp decline in the role of the public milling sector, and the appearance of a disorganized, high transcaction cost industry. An analysis of the 1994/95 rice marketing year is presented in this study.

In a previous study completed by the University of Arkansas (Eric Wailes, Study Leader) in March, 1995 titled *"Impacts of Agricultural Policy Reforms on Rice Production, Milling, Marketing, and Trade in Egypt"* (USAID Project No. 263-0202-3-91148) several suggestions to improve the performance of the rice economy were made. The study recommended that the Government of Egypt (GOE) should 1) encourage greater participation of farmers in the marketing and processing of rice, 2) develop policies that improve the grades and standards for rice quality in Egypt, 3) encourage private investment and contractual arrangements to develop a more efficient physical infrastructure to meet the rice marketing system requirements, 4) develop a market information system which communicates market signals quickly and accurately to all participants in the rice industry, 5) resolve the issue of privatization of public mills to achieve improved market efficiencies. Those recommendations remain valid based upon the findings of this study.

1.1 Key Findings

- Rice production has increased as a result of increased profitability, primarily due to higher prices more comparable to border prices than in the past.

- Egyptian rice producers are becoming more market-oriented, reflected in larger sales to rice dealers, and nearly all sales made through the private sector.

- Egyptian rice producers appear to be sensitive to market conditions and make their production and marketing decisions based upon available information.

- Paddy rice dealers have increased the share of their purchases that they have milled. The average trader margin for paddy rice was found to be 83 LE/mt (metric tons) which compares to an estimated margin for milling the paddy rice of 110 LE/mt.

- Rice dealers who purchased and sold milled rice reported an estimated trader margin of 137 LE/mt.

- Egypt has four distinct mill types: small village mills, older small commercial mills, newer small commercial mills, and large public mills. A comparative analysis indicates very different milling margins for these four mill types--38, 181, 20 and 154, respectively. The newer commercial mills are the most technically efficient mill but have not established profitable paddy procurement and milled rice and by-product markets. Most surprising, however, is that the public mills surveyed reported a significant recovery and participation in the rice market.

- Export trade appears to involve relatively small transactions, by international standards. The average export price of $444/mt compares with an estimated border price of $420/mt. Thus it appears that for at least part of the 1994/95 crop year that Egyptian price levels exceeded world prices, making Egypt's rice less competitive on the world market.

- Analysis of internal price relationships using a cointegration framework found support that the retail and wholesale prices at the national average levels and across markets appear to be reasonably integrated, i.e. there exists a stable, long-run equilibrium relationship among internal rice markets.

1.2 Recommendations

- While the 1994/95 market analysis suggests that the market-oriented rice economy in Egypt is maturing, sound market information on prices and volumes traded are not well known. Absence of such information creates higher marketing costs, resulting in inefficient resource allocation. Therefore, the primary priority of the Government of Egypt (GOE) should be to establish national market information and news system.

- The rice market would benefit from strengthening trade organizations and assistance in educational programs regarding the marketing activities, such as grading and inspection, and use of risk management options to buy and sell rice. The GOE should consider a licensing permit system for rice traders, which would give the government a degree of control on the rice trader marketing practices, hopefully resulting in a more orderly marketing system.

- A training and research program should be funded which assists rice traders and exporters in better understanding domestic and export market opportunities.

- The GOE should be committed to maintaining competitive domestic prices relative to border prices. When internal prices rise above the border price, as appears to be the case in 1994/95, the GOE should facilitate rice imports to arbitrage such market distortions. Similarly when internal prices appear to be depressed relative to border prices, restraints on exports should be identified and removed.

- Information on the public milling sector suggests that it may be on the way to recovery. The problem of labor redundancy and the existence of a number of inefficient mills remains a problem, causing the price of milled rice to be excessively high. The GOE should liquidate the least promising of the public mills and remove all operational constraints from the remaining mills such that they can participate freely in the rice market.

2.0 INTRODUCTION

The liberalization of Egypt's rice economy, including the elimination of producer delivery quotas, the movement towards market determination of producer prices, and the termination of restrictions on private sector processing and marketing of rice, has created a market-oriented environment. These policy changes were made, however, without the prior development of the traditional institutions and attributes normally associated with a well-functioning private market such as a price reporting system, an established system of incentives and discounts for quality variations, wholesale grain markets with private ownership of storage and milling facilities, established trade flows and transportation facilities. The result has been a disorganized market, with what appears to be high transactions costs due to market risk and uncertainties, price relationships that do not reflect market integration and arbitrage activities.

3.0 BACKGROUND

This study is an outgrowth of a previous study completed by the University of Arkansas (Eric Wailes, Study Leader) in March, 1995 titled *"Impacts of Agricultural Policy Reforms on Rice Production, Milling, Marketing, and Trade in Egypt"* (USAID Project No. 263-0202-3-91148). That study analyzed the Egyptian rice market with respect to the market reforms and the evolving public-private marketing system. It recommended further studies of the rice market in order to develop a useful description of the changing market structure and behavior in order to provide recommendations about how to further the market reform and role of the private and public sectors. Thus, the current study will build upon the previous study by adding an additional year of observation of Egypt's rice market. The Government has two primary concerns about the rice market. First, it is believed that the area planted to rice is excessive. The over-planting of rice is a result of the favorable profitability of rice relative to other summer crops. The relative profitability however is a result of many factors. Second, of the many contributory factors, the one that most concerns the Government is the immaturity of the rice market with respect to market coordination and efficiency. It is generally believed that many new private market participants in the rice market have contributed to naive speculation and overshooting of prices. Relatively high rice prices were maintained as a result of the unwillingness of the government to import cheaper rice which would have brought discipline to the market.

The Wailes study found that the rice policy reforms resulted in a substantial change in the rice market structure, the marketing patterns, number of participants, and marketing margins; and that rice producers and marketers have become subject to greater marketing risk and instability. The Wailes study recommended that the Government of Egypt (GOE) should 1) encourage greater participation of farmers in the marketing and processing of rice, 2) develop policies that improve the grades and standards for rice quality in Egypt, 3) encourage private investment and contractual arrangements to develop a more efficient physical infrastructure to meet the rice marketing system requirements, 4) develop a market information system which communicates market signals quickly and accurately to all participants in the rice industry, 5) resolve the issue of privatization of public mills to achieve improved market efficiencies.

4.0 PROJECT OBJECTIVES

- Prepare an economic analysis of the 1994/95 rice marketing year in Egypt.
- Present findings at a workshop with all elements of the rice economy represented.
- Evaluate effects of elimination of consumer subsidies for rice prices and marketing.
- Develop performance indicators of two sets of policies--1) liberalization of the rice market and increased role of the private sector and 2) improvement and adoption of technology in the rice sector.

5.0 STUDY APPROACH

- Conduct a survey of rice producers, traders, millers, and exporters to identify the pricing and distribution patterns during the 1994/95 marketing year.
- Summarize survey results in a preliminary report and conduct an informal meeting with individuals familiar with Egypt's rice industry.
- Draft a report and present final results at a formal workshop on rice marketing in Egypt with all elements of the industry represented.

The objective of this report is to summarize the results of the survey of rice producers, traders, millers, and exporters and evaluate the price relationships for the 1994 rice marketing year.

The survey was designed by the research team with review by Ron Krenz. The survey was conducted over the period of June-August 1995. The survey data was collected and processed by the Ministry of Agriculture and Land Reclamation (MALR). The structure of the survey is given in Table 1.

6.0 RESULTS

6.1 Producer Survey

6.1.1 Land Holding, Rice Area, Production and Yield

The producer survey results are summarized by governorate and by size of rice holding. The sample size was 200 with respondents from only the four primary rice-producing governorates: Behera, Dakahlia, Kafr El-Sheikh, and Sharkia. Four categories were used to analyze the data with respect to farm size. The size classes were defined as:

I less than or equal to 1 feddan of rice,
II greater than 1 and less than or equal to 3 feddans,

III greater than 3 and less than 5 feddans, and
IV five or more feddans of rice.

Information on sample size, land holding, rice area, and yield, based on the producer survey by governorate, is given in Table 2. Behera and Sharkia governorates each accounted for 20 percent of the sample while Kafr El-Sheikh had 24 percent and Dakahlia had 36 percent. In terms of rice area, Behera had 15 percent, Sharkia 24 percent, and Dakahlia and Kafr El-Sheikh 30.5 percent each. Due to yield differences by governorate, the survey sample representation of rice paddy production was 12 percent for Behera, 22 percent for Sharkia, 30 percent for Kafr El-Sheikh and 36 percent for Dakahlia.

The 200 farmers in the survey had a total land area of 862 feddans or an average of 4.31 per farmer. The area under rice cultivation was 413 feddans, 2.06 per farm which was 53.4 percent of total land use. Compared to the 1993 survey (Wailes *et al.)*, rice was a relatively more important crop, reflected by an increase of its share of cropland by 7 percent. Rice was relatively more important in the cropping system for the farmers from Dakahlia (65 percent of land planted to rice) and least important in Behera (40 percent planted to rice). On average, the 1994 producers indicated that they planted more rice acreage with the largest increase in rice cropping intensity in Dakahlia which planted 65 percent compared to only 53% in 1993. Expanded rice planting from the previous year was reported for all governorates. The survey sample reported an average increase in rice area of 0.24 feddans, a 13 percent increase. This expansion per farm was largest for Dakahlia at 0.3 feddans (17 percent increase) and smallest for Behera at 0.13 feddans (a 12 percent increase).

The reasons important to farmers in their decision to produce rice are summarized in Table 3. The most important reason is the production for their own family's consumption needs. 93.5 percent of producers identified this reason. The second most often cited reason given, by 53 percent of producers, is that rice is their most profitable crop. This is followed by a related reason, higher market prices, which was cited by 45.5 percent of producers. 77.5 percent of farmers in Behera cited higher market prices while only 36.1 percent of Dakahlia's producers cited this reason. A surprising 40.5 percent of the producers indicated that an increase in the government price was a reason for rice production, despite that fact that the government price was not significantly increased from the previous year. Compliance with official rotation recommendations was cited by approximately 45 percent of farmers in Dakahlia and Sharkia, but by only approximately 3 percent of producers in Behera and Kafr El-Sheikh governorates. Policy reforms which terminated the compulsory quota deliveries to the government was given as a reason for rice production by 39.5 percent of producers, thus helping to explain the expansion in Egypt's area under rice cultivation since the policy reforms. Agronomic related factors, such as land suitability for rice, coordination with neighbors, and improvement in the soil such as reduced soil salinity were rarely indicated to be important reasons why producers planted rice.

Average paddy yield per feddan for the entire survey sample was 2.79 mt (metric tons). Yields were highest in Behera at 3.18 mt/feddan and lowest in Kafr El-Sheikh at 2.55 mt/feddan. However, because of the larger farm size, total rice production per farm was highest in Kafr El-Sheikh at 6.38

mt and lowest in Behera at 3.78 mt. The average rice production per farm for the entire sample was 4.31 (see Table 2).

The survey sample farm size distribution, based on feddans planted to rice, is given in Table 4. The largest number of observations, 43.5 percent, were in the smallest farm size class I, and 37 percent were in the 1-3 feddan class II, 9 percent in the 3-5 feddans, class III, and 10.5 in the largest farm size class IV, 5 or more feddans of rice. With respect to rice area and paddy production, the farm size class IV accounted for the largest share, 34 and 33.6 percent, respectively. Size class II had similarly, nearly a third of the rice area and production, while the small class size I and class size III each accounted for approximately 16 percent of the rice area and paddy production.

The average land area per farm by class size ranged from 2 feddans for the smallest to nearly 14 feddans for the largest class size. Average rice area was 0.75 and 6.68 for the smallest and largest class sizes, respectively. Cropping intensity for rice was least for the smallest farms, 43.8 percent of land planted to rice, while the second, third and fourth largest classes planted 61, 64 and 57 percent of their land to rice on average.

Table 5 provides a summary by size classes of the percent of farmers who cited various reasons for why they produce rice. Production of rice for self-supply was cited by similar percentages of producers regardless of their size of rice production. It appears that the percents of farmers who cited profitability and compliance with official rotation recommendations, as important reasons, are positively correlated with size of rice production. However, for the other reasons cited, no clear differences appear to be associated with rice farm size.

Average yields by farm class size (Table 4) appear to be negatively correlated with farm size. The smallest farms had an average yield of 2.99 mt/feddan while the two largest farm size classes had average yields of 2.72 mt/feddan.

6.1.2 Disposition of Paddy Rice by Utilization Category

Information on the percent use and sales of paddy by the survey farmers to various channels are given in Tables 6 and 7. For the entire sample, 5.6 percent of production was used for payment of production costs which is slightly lower than the 6.7 reported by Wailes *et al.* (p. 166) from the 1993 survey. Family consumption utilized 22.8 percent of the paddy in 1994 compared to a finding for 1993 of 27.2 percent. Sales to local village merchants accounted for the largest disposition of paddy production at nearly 47 percent, compared to only 32 percent in 1993. However, compared to 1993, a slightly smaller percent of paddy production, only 18.4 percent, was sold to merchants from other villages in the same governorate compared to the 1993 share of 20.8 percent. Only 2 percent was sold to merchants from outside the governorate, comparable to the 1993 estimate of 2.4 percent. Direct sales to cooperatives accounted for only 0.5 percent of use and no sales of paddy to the government were reported by any producer. Data on direct sales of paddy to private mills were not asked; however, the residual "other sales" category received 3.9 percent of the paddy compared to 1.5 percent in 1993.

These findings suggest that the Egyptian rice producers are becoming more market-oriented, especially in terms of sales of paddy to local rice traders. This pattern holds for all class sizes as indicated in Table 6. While the two middle class size categories, II and III, were grouped in the 1993 analysis, a comparison of the 1994 estimates with 1993 indicates that farms with less than 1 feddan of rice sold 48 percent to local merchants in 1994 compared to only 33 percent in 1993. The second and third largest farm size classes sold 50 and 55 percent, respectively, to local traders in 1994 compared to only 32 percent in 1993. Even the largest size class producers sold more of their production in 1994 to local traders at 39 percent compared to only 34 percent in 1993. Sales of rice to paddy traders from other villages in the same governorate and outside governorates, however, appears to be highly correlated with farm size.

Differences in the disposition of paddy by governorate are indicated in Table 7. Behera producers use 9.4 percent of paddy production to pay for production expenses while producers in Sharkia reported almost zero use of rice for this purpose. Family consumption accounted for 25 to 26 percent in Behera and Dakahlia governorates, but only 20 percent in Kafr El-Sheikh and Sharkia. Sales to the local village merchants ranged from a low of 41 percent in Kafr El-Sheikh to a high of 52.5 percent in Dakahlia. Sharkia producers sold 31 percent of production to rice traders from other villages in the same governorate, while producers in the other governorates sold a much lower share of their production in this way. Only producers in Behera and Kafr El-Sheikh sold much paddy to rice merchants from other governorates. Sales to cooperatives were reported only by producers in Kafr El-Sheikh. "Other sales" accounted for 6 percent in Behera and 9 percent in Kafr El-Sheikh.

Table 8 summarizes the trends in private market orientation of paddy sales. As indicated in the table, nearly all of the marketable surplus paddy was sold through private sector sales in 1994. Thus, it appears that at the farm level, Egypt has achieved a full market orientation of its rice producers.

6.1.3 Prices Received by Producers for Paddy Rice

The average price received for Paddy Rice by the producers in this study was LE 605 per mt, LE 205 higher than the average price received by the farmers in the 1993 study. Average prices received by sales category are reported in Tables 9-11. Table 9 contains information on average prices received by various farm size classes. Pecuniary economies of size appear to hold with respect to prices received by producers. The average prices received by the two smallest size classes were approximately LE 578/mt, while the farms with 3 to 5 feddans and more than 5 feddans of rice received average prices of LE 600/mt and LE 644/mt respectively. The highest prices across all size categories, except for the smallest size class, were paid by rice merchants from other villages within the same governorate, on average LE 680/mt compared to an average of only LE 607/mt by local village merchants and LE 634 by merchants from other governorates. The shadow prices reported for paddy sales for payment of production expenses and for family consumption averaged approximately LE 514/mt. The average price paid by cooperatives was an extremely low LE 370/mt, perhaps due to quality discounts. Unfortunately, the prices reported were not standardized according to quality differences.

Table 10 indicates differences in average prices received across governorates by sales category. The average price paid to farmers was highest in Sharkia at LE 707/mt and lowest to producers in Kafr El-Sheikh and Behera at LE 556/mt and 566/mt respectively. Dakahlia producers received an average price of LE 608, similar to the four governorate average of LE 605/mt.

Prices for paddy rice as payments for production expenses were reported only by producers in Behera and Kafr El-Sheikh, at LE 607/mt and 452/mt respectively. Price estimates for the value of family consumption also were reported only for Behera and Kafr El-Sheikh at LE 566/mt and 461/mt respectively. Prices paid by local village rice dealers were in the range of LE 577/mt to 595/mt for producers in Behera, Dakahlia, and Kafr El-Sheikh and LE 676/mt in Sharkia. Sale prices of paddy to merchants from other villages in the same governorate were LE 651/mt in Dakahlia and LE 654/mt in Kafr El-Sheikh and LE 757/mt in Sharkia. These merchants paid on average LE 56/mt to 77/mt more than local village merchants. Again, there is no information to ascertain the role that quality differences may have had in generating these average price differences. Average prices to merchants from other governorates ranged from a low of LE 498/mt in Behera to a high of LE 720/mt in Sharkia. Only in Kafr El-Sheikh did these outside merchants pay an even higher price than prices paid by rice merchants from Kafr El-Sheikh governorate.

While some of the differences in prices by sales category are not consistent across farm size classes or governorates, in general, the average price relationships appear to reflect expected differences in place and product utility. The pricing policy by the government cooperatives at a very low discount relative to the private market channels, LE 370/mt versus LE 644/mt (Table 11), is the obvious explanation for the complete dominance of private market sales of paddy at the farm level in 1994. This pricing policy has clearly provided a positive incentive and benefit for the development of the private trade. However, to the extent to which the storage, milling and processing capacities of the cooperative/government facilities were underutilized as a result of this policy, this pricing policy may also have been unnecessarily expensive.

6.1.4 Paddy Pricing Methods and Sources of Market Information

Producers were asked how they priced their paddy rice and what were their primary sources of rice market information. The survey results to these questions are presented in Tables 12-15. Producers indicated that their understanding of the supply and demand conditions was the primary factor by which they developed price expectations. The second most cited method was to price based on offers made by paddy merchants. The village market price as well as some quality and grade factors such as cleanliness and variety were cited on average by 10 percent of the producers. There appear to be no clear differences in the responses by farmers across governorates and by class of farm size.

6.1.5 Source of Seed Rice

Producers in the survey were asked to identify the source of the seed for planting their rice crop. The results are given in Tables 16 and 17. The dominant source was from the farmer's own previous rice crop, 38 percent for the entire sample with a high of 57.5 percent in Behera and a low of 23.6 in Dakahlia. Second in importance was PBDAC/Village Banks which accounted for 28.5 percent and the largest percent in Kafr El-Sheikh governorate. Paddy merchants, other farmers and cooperatives supplied the remainder at 20, 14 and 7 percents respectively. The size of farm class is negatively related to using the previous crop for seed. The larger farms rely more heavily on the credit banks, cooperative and paddy merchants.

6.1.6 Seasonal Marketing Patterns for Egyptian Rice Producers

Weekly volume and cumulative volume of paddy rice by Egyptian producers are given in Table 18. The data indicate a fairly typical marketing pattern with the bulk of the crop (54 percent) marketed within the first two months after initiation of harvest. The largest volume marketed in a single week is during the second week in November (Figure 1). Three-fourths of the crop is marketed by the first week of January, and the remaining 25 percent is sold more gradually over the remainder of the marketing year.

These preliminary results suggest that Egypt's rice farmers have become very market-oriented. The market has provided a significant premium over the traditional cooperative/government procurement system. This has resulted in almost no procurement (as reported by survey farmers) by the public sector from farmers directly. Additional results from the remainder of the survey which includes rice dealers, millers, and exporters will be provided in the following sections.

6.2 Dealer Survey

6.2.1 Purchases of Paddy Rice

The dealer survey for this studied examined the buying practices of merchants for paddy and milled rice. The sample included 40 merchants for four governorates (Behera, Dakahlia, Kafr El-Sheikh, and Sharkia, Table 19a). The results of the survey are summarized by governorate as well as by the volume of paddy rice purchased by the dealer. These categories include: 1) zero purchases, i.e. only traded milled rice, 2) very small dealers, 1 to 50 tons, 3) small dealers, 51 to 100 tons, 4) medium dealers, 101 to 250 tons, and large dealers, more than 250 tons. The sample by dealer size was 37 with zero purchases, 48 very small dealers, 45 small dealers, 28 medium dealers and only 2 large dealers. All dealers who purchased paddy rice purchased japonica type, while only 16 percent purchased the long grain "filipino" type. Dealers from Sharkia did not trade filipino rice and data for Behera dealers on paddy purchases were unavailable (Table 19a). While large dealers did not trade filipino rice, medium size dealers were more likely to handle filipino than the smaller-sized dealers (Table 19b).

The total quantity of paddy rice purchased by the dealers in this survey was 6,790 mt (Table 20). The distribution by source of purchases is given in Table 21. For the entire sample, 56 percent of the japonica rice and 30 percent of filipino was purchased from the dealer's local village farmers. The other major sources of paddy were farmers from other villages, accounting for 42 percent of japonica and 60 percent of filipino purchases. Only 2 percent of japonica paddy was purchased from other rice dealers. The average volume purchased per dealer is given in Table 22. The average volume traded was 73 mt, with dealers in Dakahlia and Kafr El-Sheikh trading slightly more than dealers in Sharkia.

The total and average volumes handled by size of dealer are reported in Tables 23 and 24. As shown in Table 25 the smaller dealers compared to medium dealers relied more heavily upon local village farmers for japonica paddy rice purchases. The small and medium size dealers accounted for a combined 78 percent of all paddy purchases (Table 26).

6.2.2 Prices Paid for Paddy Rice

Prices paid for paddy rice are reported in Tables 27 and 28. The weighted average price paid for paddy was 597 LE/mt (similar to the producer survey average price received and the MALR reported farmgate average price of 605 LE/mt). Japonica prices averaged 599 LE/mt and filipino 520 LE/mt. Dealers paid higher prices to other village farmers than to their own village farmers, 55 LE/mt more for japonica and 98 LE/mt more for filipino.

6.2.3 Disposition of Paddy Rice by Utilization Category

The marketing patterns of the rice dealers in the survey are presented in Tables 29 and 30. The dominant sales flow of paddy rice was to sell as paddy (68 percent). Dealers also had 28 percent of their paddy rice purchases milled to be sold as milled rice. One percent was retained for personal consumption, while three percent of purchases were in storage (July, 1995). This pattern was different by governorate with dealers in Dakahlia more inclined to mill a higher percentage of their paddy purchases compared to Kafr El-Sheikh and Sharkia dealers (Table 29). There were no differences in the marketing patters among the very small, small and medium-sized dealers (Table 30). The two large dealers sold all paddy purchases as paddy.

6.2.4 Paddy Rice Sales by Rice Dealers

The distribution of paddy sales by rice dealers is identified by sales to consumers, retailers, and wholesalers, in the dealers own village, other villages and towns in their own governorate, and in villages and towns in other governorates. This information is summarized in Tables 31 and 32. Wholesalers purchased 44 percent of the paddy dealers sales, retailers bought 34 percent and consumers bought 22 percent. These patterns are different by governorate. For example, dealers in Dakahlia sold substantially more to consumers than retailers compared to dealers in other governorates. Differences in paddy sales were relatively similar by size of dealer, although the larger the dealer size the less important are sales to consumers.

Total sales to consumers, retailers and wholesalers in the dealers' own village accounted for 28 percent of volume, 30 percent went to other villages in their own governorate, 28 percent to towns in own governorate, and 14 percent to villages and towns in other governorates. This suggests that rice dealer trade tends to very be localized. Even medium and large size dealers were very localized in the sales pattern of paddy rice.

6.2.5 Prices and Margins Received by Dealers for Paddy Rice

Average prices for paddy rice sold by rice dealers are reported in Tables 33 and 34. The average price received was 680 LE/mt, implying an average dealer margin for trading paddy rice of 83 LE/mt, based on the average price paid of 597 LE/mt (Tables 27 and 28). This estimate may be high since the average dealer price in Behera was nearly 100 LE/mt higher than in the other governorates. In addition, the average price paid for paddy did not include Behera traders in the calculation. The average trader margins for Dakahlia, Kafr El-Sheikh, and Sharkia dealers were 74, 54, and 59 LE/mt respectively (Tables 27 and 33). While average prices received for paddy sales for all sizes of rice dealers were similar, due to differences in prices paid for paddy rice, their relative trader margins were quite different. The two large dealers enjoyed an average margin of 202 LE/mt, the very small dealers received a 110 LE/mt margin, small dealers got 93 LE/mt and medium dealers received 60 LE/mt (Tables 28 and 37).

Prices received by dealers from consumers at various locations in the market channel are given in Tables 34 and 38. Prices appear to be reasonably integrated across locations, with exceptions for Behera dealers selling at much higher prices to consumers in their own village than in other villages, and sales by medium size dealers at a considerable margin to consumers in their own village and in villages outside the governorate. Prices received from retailers by location are given in Tables 35 and 39. These results indicate that retailers in villages pay a substantial premium above prices paid by retailers in towns and cities. This pattern, however, does not hold in general for differences in prices paid by wholesalers in villages and towns, except for sales by medium-sized dealers. (Tables 36 and 40).

6.2.6 Paddy Rice Milled, Mill Type, and Disposition

Rice dealers milled 28 percent of their paddy purchases. Of this amount, most was milled at local village mills, 62 percent (Table 41). Commercial mills process 26 percent and the dealers milled 12 percent in their own mills. Considerable difference in this general pattern existed across governorates. Dealers in Kafr El-Sheikh appear to have their own village mill, processing 69 percent of their paddy purchases. On the other hand, dealers in Behera and Sharkia had no rice milled at their own mills. The average milling rate was 69 percent, lowest at 65 percent in Kafr El-Sheikh and highest in Dakahlia at 71 percent, which is surprising given their dependence on small village mills, typically with low milling rates. The average milling costs were 22 LE/mt for mill only and 23 LE/mt for mill and polish. These costs varied from a low in Dakahlia of 16 LE/mt to a high of 31 LE/mt in Behera, perhaps a questionable estimate since it is 7 LE/mt higher than their reported mill and polish cost. Choice of mill type, milling rates and costs were very similar across dealer size, except for the 2 large dealers who relied solely upon small village mills (Table 42).

The disposition of the milled rice that was purchased originally as paddy is reported in Tables 43 and 44. The sales pattern on average was 18 percent to consumers, 26 percent to retailers in the dealers own governorate, 20 percent to retailers in other governorates, and 36 percent to wholesalers. Patterns were different across governorates. Dealers in Dakahlia and Kafr El-Sheikh tended to market more of their milled rice through wholesalers, while Behera dealers relied more on retailers and Sharkia dealers sold more directly to consumers. The patterns by size of dealer shown in Table 44 indicate that the smaller dealers are more reliant upon selling their milled rice locally to consumers or retailers rather than outside retailers and wholesalers.

6.2.7 Milled Rice Prices, Costs and Margins for Dealers

Average prices received by dealers for the milled rice that was purchased as paddy rice are given in Tables 45 and 46. The average price received from consumers was 1072 LE/mt, retailers 1045 LE/mt, wholesalers 817 LE/mt, and a weighted average of 967 LE/mt. Price differences between consumers and retailers appear reasonable, however, wholesalers paid more than 200 LE/mt less for the milled rice, which was due to the particularly low prices from wholesalers reported for dealers in Dakahlia. The price patterns across market channel were relatively similar for all sizes of rice dealers (Table 46).

To estimate returns to dealers from milling paddy, rice milling costs and milling rates reported in Table 41 and 42 are used. A credit of 200 LE/mt is assumed for by-product prices. Two paddy prices are used to estimate the cost of paddy, the cost of paddy purchased as reported in Tables 27 and 28 and the opportunity cost of paddy based upon the average price of paddy rice sold by the dealers as reported in Tables 33 and 37. Based upon the actual paddy purchase price, the average return to the dealer to mill and market the paddy as milled rice was 110 LE/mt. Returns using this approach for dealers in Dakahlia, Kafr El-Sheikh, and Sharkia were 52, 119, and 151 LE/mt respectively. For the dealers by size category, very small, small, medium, and large, the returns were 99, 105, 110, and 293 LE/mt respectively.

Using the opportunity cost of the paddy sales price, the average return to milling the paddy compared to selling it as paddy is only 27 LE/mt. For the governorates Dakahlia, Kafr El-Sheikh, Behera, and Sharkia the returns using the opportunity cost estimates were -22, 65, -10, and 107 respectively. By dealer size, very small, small, medium, and large, the returns were -11, 12, 50, and 91 respectively.

6.2.8 Purchase and Purchase Price of Milled Rice

The source of milled rice purchases by rice dealers is shown in Tables 47 and 48. The primary source of purchases is from local village farmers at 34 percent. Purchases from other dealers in the same village and in other villages accounted for 20 and 29 percent of the purchases respectively. Purchases from mills included 7 percent from small village mills, 4 percent from commercial mills, and 5 percent from public mills. In addition to the 37 dealers who traded in milled rice only, only very small and small paddy rice dealers also bought milled rice for trade. Medium and large size rice dealers appear to be specialized in either paddy or milled rice trade.

Average prices paid by dealers for milled rice are reported in Tables 49 and 50. The average price paid was 1,012 LE/mt, ranging from a low paid to own village farmers of 982 LE/mt to a high of 1140 LE/mt paid to small mills in other villages. Ranges of prices across governorates and dealer size were similar.

6.2.9 Sales and Prices Received for Milled Rice Purchases

The sales of rice that was purchased as milled rice are given by destination in Tables 51-54. Consumers were sold 57 percent of the total sales, retailers 31 percent, and wholesalers 12 percent. Sales in the dealers' own village accounted for 34 percent of the sales, 60 percent went to towns in the same governorate and only 6 percent to towns in other governorates, again suggesting that trade tends to be localized. Sales patterns by market channel tended to be similar across governorates and dealer size, except that only Dakahlia dealers sold through wholesalers (Table 52), and only those dealers who traded in milled rice only (Table 54). Milled rice purchases and sales tend to be dominated by dealers that trade in milled rice only. Data in Table 55 indicates that milled rice only dealers accounted for 84 percent of the reported sales.

The average sales prices of rice purchased as milled rice are reported in Tables 56 and 57. The average sales price for all destinations was 1149 LE/mt. Similar to price relationships for sales of milled rice purchased as paddy (Tables 45 and 46), consumers paid the highest price, 1183 LE/mt. Wholesalers, however, paid a higher price than retailers, unlike the relationship for milled rice prices in Tables 45 and 46. No prices for milled rice sales were reported for Kafr El-Sheikh, but prices were similar across the other governorates. Prices by size of dealer present an interesting relationship (Table 57). Dealers who did not trade in paddy but milled rice only had remarkably similar prices across market channel. On the other hand the paddy dealers, both very small and small, sold milled rice at a substantial premium to consumers compared to prices for retailers.

Margins generated by rice dealers from buying and selling milled rice are reflected in the differences in prices paid (Tables 49 and 50) and prices received (Tables 56 and 57). The average estimated margin across all traders was 137 LE/mt. Margins for dealers in Dakahlia, Behera, and Sharkia were 108, 194 and 100 LE/mt respectively. Margins by dealers size, milled rice only, very small and small paddy dealers were, 83, 86 and 131 LE/mt respectively.

6.3 Mill Surveys

Four different types of rice mills were surveyed for this study. Egypt has nearly 2,000 small village mills with a one-pass milling technology. There are reported to be 37 traditional private commercial mills with technology for more than one pass. The public sector has owned 52 relatively large, modern rice mills and finally, following the market liberalization, private investment in new mills which are small but with very modern technology has taken place since 1990. This survey identified eight new modern rice mills. The following discussion examines each type of mill based upon the survey data collected on mill structure (age, size, utilization), operations (volume, months of operation, milling rates and costs, and capacity utilization), paddy procurement and shipment patterns, and price paid and received. Comparisons of the alternative mill types are based upon the information developed from the survey data.

6.3.1 Small Village Rice Mills--Structure and Operations

Mills from eight governorates were surveyed (Table 58). For the 66 mills included in this study, the average year of establishment was 1972. Milling capacity ranged from 2 to 900 mt/month with an average for all mills of 137 mt/month. These mills were in operation for 8.2 months in 1993/94 compared to 8.3 months in 1994/95, a slight increase, due to the increased rice production (Table 59). The average annual volume of paddy rice received by these small village mills was 571 mt. At full capacity utilization, this volume of paddy could have been milled in 4.2 months. Full capacity is defined as 10 hours per day, 30 days per month. This implies that, on average, the small village mills operate at approximately 50 percent of capacity throughout the milling season.

The small village mills reported receiving a total 37,718 mt in 1994/95 (Table 60). The distribution of how this paddy was sourced is given in Table 61. Farmers in the mills' own governorate supplied 69 percent of the paddy milled, wholesalers in the governorate supplied 15 percent, wholesalers from other governorates supplied 3 percent and the remaining 12 percent was supplied by retailers. This procurement pattern was very similar across the various governorates (Table 61).

6.3.2 Small Village Rice Mills--Prices, Costs, and Returns

Prices paid for paddy are reported in Table 62. The average price paid was 679 LE/mt, which compares to 597 LE/mt average price paid by dealers, but is very similar to 680 LE/mt, the average price received by rice dealers for paddy sales. The average price received for milled rice was 1020 LE/mt. Millers reported the volume and prices received for rice by-products. The estimated average for mill feed was 199 LE/mt. The average milling rate for the small village mills was estimated to be 66 percent, with a range of 65 to 70. Average milling costs were estimated at 24 LE/mt. Based upon these prices, costs and technical relationships, an average milling margin for the small village mills was estimated to be 38 LE/mt (Table 62).

6.3.3 New Commercial Rice Mills--Structure and Operations

Data was collected for eight new private commercial mills. These mills were established over the period of 1990 to 1995 (Table 63). The average designed milling capacity of these mills is 177 mt/month, but the actual or rated capacity is only 136 mt/month. These mills ranged in size from 400 mt/month to only 40 mt/month. Therefore they would be considered as relatively small.

The new private mills operated 6.9 months in 1994/95 compared to 7 months in the previous year. The average volume of paddy received was 1,066 mt. At full capacity utilization, these mills would operate for 6.7 months. Based on this estimate, the new mills appear to be utilized at near full capacity, 93 percent. The procurement patterns of the new private mills is reported in Table 65. Only 15 percent of paddy originates from farmers. Rather, these mills are very reliant upon supplies from wholesalers, who accounted for 71 percent of the paddy purchases.

6.3.4 New Commercial Rice Mills--Prices, Costs, and Returns

The average prices, costs, and milling margins for the new commercial mills are reported in Table 66. The average price paid for paddy rice was 684 LE/mt. The average price received for milled rice was 957 LE/mt. Sales of rice by-products was estimated to average 194 LE/mt. As would be expected, due to the modern technology, these mills have a high milling rate of 71 percent. The estimated average milling cost is 29 LE/mt. Based upon these average estimates the average milling margin estimated for the new commercial mills is 20 LE/mt.

6.3.5 Old Commercial Rice Mills--Structure and Operations

Structure data for the older commercial mills is reported in Table 67. Of the 10 mills surveyed, the average age of the mill was 25 years, with a range of 3 to 60 years. The average designed capacity of these mills was estimated to be 138 mt/month with a rated capacity of only 86 mt/month. Therefore, on average these are smaller than the small village one-pass mills. These mills reported being in operation for 7.3 months for both 1993/94 and 1994/95 milling years (Table 68). The average volume of paddy received by these mills was 659 mt, which if milled at full capacity would require six months of operation. The implied average capacity utilization of these mills is then estimated to be 79 percent. The pattern of paddy rice receipts by source is given in Table 69. The older commercial mills, unlike the newer ones, are relatively less dependent upon wholesalers, but more on farmers and retailers. They source slightly more of their rice from their own governorate than do the newer mills (Tables 65 and 69).

6.3.6 Old Commercial Rice Mills--Prices, Costs, and Returns

The procurement prices paid for paddy rice was estimated to average 545 LE/mt (Table 70), substantially lower than newer mills and small village mills reported. The average price received for milled rice was estimated at 989 LE/mt. The older commercial mills, with perhaps well-established buyers, reported a higher average price received for mill by-products of 263 LE/mt. Due to the age of their mills, however, they reported a lower milling rate, averaging only 68 percent compared to 71 percent for the newer mills. The average estimated milling cost was found to be 29 LE/mt. Based on these average values, the average milling margin estimated for the older commercial rice mills is 181 LE/mt.

6.3.7 Public Rice Mills--Structure and Operations

Following liberalization of rice procurement in Egypt, the public milling sector was unable to compete effectively for paddy supplies as discussed by *Wailes et al., 1995*. Eight public mills were surveyed in 1995. The structure data for these mills are reported in Table 71. The average year of establishment for these mills was 1969, with a range of 1960 to 1980. The reported design capacity per mill was 4,938 mt/month, or a total for these ten mills of 38,500 mt/month. This is approximately 25 percent of the entire public milling capacity. The average rated capacity was estimated to be 3,006 mt/month. The public mills reported that they were in operation on average for 9 months during the last two milling years (Table 72).

The average volume of paddy received for milling by the public mills was 26,000 mt, which if true for all public mills, would represent a substantial increase in procurement in 1993/94 of approximately 10,000 mt (based on Wailes *et al., 1995*). An average volume of 26,000 mt would require full capacity utilization of 7 mill months. Therefore, the estimated mill capacity utilization for the public mills in 1994/95 is estimated to be 72 percent, a surprising increase above the several previous years. The procurement pattern for the public mills reported in this survey is presented in Table 73. The public mills reported that 58 percent of the paddy was purchased directly from farmers, 45 percent from their own governorate and 13 percent from other governorates. Wholesalers provided 28 percent of supplies, retailers 11 percent and the Ministry of Supply provided 2 percent.

6.3.8 Public Rice Mills--Prices, Costs, and Returns

Average estimates of prices, costs and returns for the public mills are presented in Table 74. The average price paid for paddy is estimated at 537 LE/mt, the lowest for all mill types. The average price received for milled rice was 958 LE/mt. The public mills have developed strong markets for the mill by-products, which are sold in large volume and good quality. This is reflected in a high average price for mill by-products of 292 LE/mt. The average milling rate reported by the public mills was 69 percent. The public mills were the only type of mills to report milling costs for a mill only and mill and polish basis. The average mill only cost was 59 LE/mt and the mill and polish cost was 95 LE/mt. The average milling margin based on the mill only costs was 154 LE/mt, while the average margin for a mill and polish basis was 117 LE/mt.

6.3.9 Comparative Analysis of Rice Mill Types

Table 75 provides a summary comparison of key structural, operating and economic estimates for the four types of mills surveyed for this study. The milling structure includes a large number of small village one-pass mills with the lowest milling rates. Due to their sheer number, however, most of Egypt's rice is milled by this type of mill. These mills operate at a relatively low level of efficiency, 50 percent of capacity. However, they have lower costs. They pay relatively high prices for their paddy but sell their milled rice at the highest rate. Along with the newer commercial mills, the small village mills accept relatively low prices for their mill by-products. Nevertheless, they manage to average 38 LE/mt milling margin.

The highest estimated milling margin is reported for the older commercial mills. The keys to their relative profitability appears to be a reasonable capacity utilization which results in relatively lower milling costs, relatively low prices paid for paddy rice, and a high price for their rice by-products.

The newer commercial rice mills are reported to be the least profitable. While they are the most technically efficient with a milling rate of 71 percent and capacity utilization of 93 percent, they pay the highest prices for paddy rice and sell their white rice at the lowest rate compared to the other mills. They also receive low prices for their by-products. Some of these results may be due to the fact that these firms are new and have not established their markets, which takes considerable time. A key to their success may be related to their ability to procure more directly from farmers compared to their current reliance upon paddy rice dealers.

Finally, the results reported for the public rice mills is promising given the dismal performance of these mills immediately following the market liberalization. If the mills in the survey are representative, then both the technical and pricing efficiency of these mills has improved immensely. Despite the high milling costs, due primarily to redundant labor (see Wailes *et al.*, 1995), the public mills are well positioned to procure paddy directly from the farmers, given their traditional dominance. While low quality paddy must continue to be a concern, the public mills have the equipment to clean and sort in order to improve the quality of the milled rice sufficiently that they can obtain reasonable milled rice prices. Finally, they have a distinct pecuniary size advantage over the other mills with respect to the markets for the mill by-products.

6.4 Export Survey

6.4.1 Structure and Operations of Export Firms

The survey of rice export firms included four establishments. These firms have been in operation on average, since 1980, and ranging from 1973 to 1987 (Table 76). However, the first year in which these firms exported rice ranged from 1980 to 1992, averaging 1986. The maximum export capacity reported by these firms was 32,750 mt on average, ranging from 1,000 to 100,000 mt. Total capacity for these four firms was 131,000 mt. Their 1994/95 export volumes averaged 9,650 mt per firm with the largest volume shipped at 20,000 mt and the smallest, 600 mt. The estimated capacity utilization estimated for each firm averaged 60 percent, ranging from 11 percent to 100 percent.

The purchases and shipments of rice for export are reported in Table 77. While the four firms reported a total export of 1994 rice of 38,600 mt, they reported the price of milled rice purchases and exports on only 17,400 mt. The average purchase price for the exports was 1181 LE/mt. While the average selling price was 1510 LE/mt, f.o.b, Alexandria. No transport, handling and storage costs were reported, therefore only a gross margin can be estimated. The export trader gross margin is 329 LE/mt.

6.4.2 Price Competitiveness of Exports

The average reported export price is $444/mt. To examine how this price compares to international prices for the 1994/95 marketing year, the California medium grain price will be used for comparison. The California (No. 1) medium grain price for the 1994/95 year averaged $390/mt, f.o.b. Following Wailes *et al*, 1995 (p. 252), we use a transportation cost from California to Middle East Markets of $45/mt and a $10/mt premium. This generates a c.i.f price of $445/mt at Middle East markets. To convert back to an Alexandria, f.o.b. price we subtract $25/mt from Middle East markets to estimate an equivalent border price of $420/mt. Thus, the estimated average export price for Egyptian rice appears to be $24/mt higher than the world reference price.

6.5 Price Analysis

In addition to the price and margin analysis presented in the previous sections based upon the survey data, an analysis of the paddy, wholesale and retail rice price relationships for the past five years is presented in this section.

6.5.1 Paddy Rice Prices

Average paddy prices received by Egyptian prices, as reported by MALR are presented in Table 78. Paddy prices averaged 65 percent higher in 1994 compared to 1990 prices, and 20 percent higher than 1993. As reflected in Figure 2, the farmgate prices are comparable across governorates and reflect spatial pricing efficiency.

6.5.2 Milled Rice Prices

Wholesale and retail milled rice prices for cities and villages for Dakahlia, Behera, Giza and the national (general) average are reported in Tables 79-82. These price data are graphed in Figures 3-6. The price patterns indicate that from 1991 until mid-1992 Giza prices, wholesale and retail, had a substantial premium, 200 to 500 LE/mt, suggesting inefficient pricing and trade flows. By July, 1992 however, all reported prices moved to a similar level and direction. This pattern held until the 1993 crop was harvested, when the milled rice prices began to demonstrate a typical seasonal price pattern, increasing from the harvest period low prices to cover the carrying costs of rice storage through the marketing season.

Margins between wholesale prices at cities and villages are depicted in Figure 7. The pattern through the 1992 marketing year was relatively stable with margins at the 30 LE/mt level. However, beginning in the 1993/94 marketing year, city-village price margins increased to a level of 60 LE/mt by the 1994/95 marketing year. A similar pattern developed for the margins between city-village retail milled rice prices. Except, the margin collapsed to zero at the beginning of the 1995 calender year. Margins between the village retail-wholesale milled rice prices are shown in Figure 9. The retail prices had a premium of 50 LE/mt over the 1991 through 1992 marketing years. During the 1993 marketing year the premium increased, continuing through the 1994/95 marketing year reaching a level of approximately 90 LE/mt, an 80 percent increase. A similar pattern for the retail-wholesale price margin is shown for the city data in Figure 10. However, after this margin reached a level of 90 LE/mt late in the 1993 marketing year, it collapsed to only 20 LE/mt during the 1995 calender year. This dramatic adjustment in price margins suggests that arbitrage and competition in retail-wholesale trade has improved.

The price patterns also reflect international price transmission as world reference prices increased dramatically during the 1993/94 marketing year. While world prices declined in 1994/95, Egypt's market prices increased slightly. As discussed above, Egypt's price levels at the border were approximately 5 percent above the reference medium grain border price. As shown in Wailes *et al*, 1995, Egypt's prices through the 1993 marketing year were lower by 12 to 40 percent compared to the border price. It now appears that world market price relationships are being transmitted to Egypt's rice market. Market price integration is one of the keys to achieving optimal resource allocation. In the next section, market price integration for the domestic wholesale and retail prices is studied.

6.5.3 Prices and Market Integration

Pricing efficiency is based on the notion that efficient trade and arbitrage activities will ensure that prices in spatially separated markets, adjusted for normal market transaction costs such as transportation and processing costs will be equalized. Market that are not spatially integrated reflect the presence of imperfect information, imperfect market structure or other causes of distortion. Pricing inefficiency results in inefficient resource allocation and product movements. Price integration across markets, known as the Law of One Price (LOP), can be measured using a cointegration framework. The data sets of monthly prices of wholesale and retail markets for urban (cities) and rural (village) locations, as reported in Tables 79-82, are used to evaluate Egypt's rice prices.

Engle and Granger's (1987) bivariate cointegration tests have been utilized to overcome the problems inherent in conventional tests of the LOP. If the two market prices are each nonstationary and need to be differenced d times to produce a stationary series, they are said to be integrated of order d (I(d)). If the two price series can be linearly combined to produce a single series that is I(d-b), they are said to be cointegrated of order (d,b). Thus if each price series is I(1), but their combination in a regression equation produces a series of error terms (ϵ_t) that is stationary, p_t^a and p_t^b are cointegrated of order (1,1). Cointegration of two times-series implies a long-run equilibrium relationship in which deviations (ϵ_t) from the LOP have a stable mean of zero.

Although a major statistical advance in testing the LOP, bivariate cointegration tests are limited to pair-wise comparisons. However, market analysts are typically interested in testing the LOP across more than two markets--as in our application. With the aid of Johansen's (1988) multivariate cointegration tests, price linkages between three or more markets can be tested. Consider a vector of n time-ordered prices X_t, where X_t is defined by the polynomial lag model:

(1) $X_t = \Sigma\pi_i X_{t-I} + \epsilon_t$, $I = 1,....,k$, $t = 1,....,T$,

where ϵ_t is a n dimensional vector of i.i.d Gaussian random errors with zero mean and a variance matrix Ω. The number of unique cointegrating vectors, r, is given by the rank of the impact matrix:

(2) $\Pi = I - \pi_1 - \pi_2 - .... - \pi_k$,

where I is a n x n identity matrix. If the impact matrix is of rank r where r < n, there are r stationary linear combinations of the variables in X_t and p - n common stochastic trends. If r = 0, there are no cointegrating vectors and there are n stochastic trends. Define two n x r matrices, α and β, such that:

(3) $\Pi = \alpha\beta'$.

Although X_t is nonstationary, the linear combinations $\beta' X_t$ are stationary. Thus, the columns of β form the r unique cointegrating vectors and the space spanned by β is the cointegration space.

Johansen shows that the maximum likelihood estimate of the space spanned by β corresponds to the r largest squared canonical correlations between the residual of X_{t-k} and ΔX_t corrected for the effects of ΔX_{t-1} through ΔX_{t-k+1}. Johansen estimates the following two vector autoregressive equations:

(4) $$\Delta X_t = \Sigma_{i=1}^{k-1} \Gamma_{0i} \Delta X_{t-1} + \mu_{0t}$$
$$X_{t-k} = \Sigma_{i=1}^{k-1} \Gamma_{1i} \Delta X_{t-1} + \mu_{1t}.$$

The residual vectors from equation (4) are then used to construct two likelihood ratio test statistics than can be used to determine the number of unique cointegrating vectors in X_t. The first test, the trace statistic

(5) $\tau_{trace} = -T\Sigma_{i=r+1}^{n}\ln(1-\lambda_i)$

evaluates the null hypothesis that there is at most r cointegrating vectors, where $\lambda_{r+1},\ldots,\lambda_n$ denotes the n-r smallest canonical correlations between the two residual vectors of equation (4). The second test, the maximal eigenvalue test, evaluates the null hypothesis that there are exactly r cointegrating vectors in X_t and is given by:

(6) $\tau_{max} = -T\ln(1-\lambda_{r+1})$.

Each test has as its alternative k > r cointegrating vectors.

Before presenting the cointegration test results, each price series is tested for stationarity with the Dickey-Fuller and augmented Dickey-Fuller unit root tests. Unit root tests use the following regression to determine the order of integration:

(7) $\Delta X_t = \alpha + \gamma X_{t-1} + \Sigma_{i=1}^{n}\phi_i\Delta X_{t-1} + \epsilon_t$

where n is zero for the Dickey-Fuller test and is large enough to ensure that the residual ϵ_t is white noise for the augmented Dickey-Fuller test. A unit root (stationarity) is rejected for values of γ that are negative and statistically different from zero using the Dickey-Fuller (1981) critical values. The Dickey-Fuller and augmented Dickey-Fuller unit-root test results are presented in Table 83. Following the literature, the test is conducted for the levels and first-differences of each of the series. In 1 of the 16 cases the null hypothesis of a unit root is not rejected for the level series at $\alpha = .05$, but is rejected for the first-differenced series for both tests. In the remaining 15 cases the null hypothesis of a unit root is not rejected for the level series, but rejection for the first-differenced series is found to hold for the Dickey-Fuller test.

Johansen's trace and maximal eigenvalue cointegration tests were utilized to test the LOP for Egypt's retail and wholesale markets. Likelihood ratio tests were used as a criteria to select optimal lag length. Optimal lag length varied, but consideration of lengths greater than the optimal number did not alter the test results. The results are reported in Table 84. Bivariate tests for both the wholesale and retail markets for the national milled market support the LOP for rural (village) and urban (city) prices. The null hypothesis is rejected for the trace test and maximal eigenvalue test for both the wholesale and retail markets.

The trivariate cointegration tests for the three markets (Dakahlia, Behera, and Giza) are also presented in Table 84. Rejection of the null, under the trace test, supports the notion that a stable long-run equilibrium relationship exists for both monthly Egyptian milled wholesale and retail prices. This result is not surprising given the rapid expansion in Egypt's rice market and number of rice traders.

Table 1. Sample Size and Distribution for the 1995 Egyptian Rice Market Study

Items	No. of questionnaires
Producers:	
Main rice production governorates[1]	160
Main rice consumption governorates	40
Total	200
Dealers:	
Main rice production governorates	160
Main rice consumption governorates	40
Total	200
Millers:	
Public sector mills	10
Traditional commercial/private mills	10
Small village/mawani mills	65
New commercial/private mills	10
Total	95
Exporters:	5
Total:	500

[1] Behera, Dakahlia, Kafr El Sheikh, and Sharkia.

Table 2. Rice Producer Survey, Sample Size, Land Holding, Production, and Yield by Governorate, 1994

Item	Units	Governorate: Behera	Dakahlia	Kafr El-Sheikh	Sharkia	All Gov'ntes
Number of Respondents	Count	40	72	48	40	200
Total Land Holding	Feddans	128.42	262.92	263.50	207.50	862.34
Area of Rice	Feddans	50.22	149.83	122.67	90.0	412.72
Land Area per Farm	Feddans	3.21	3.65	5.49	5.19	4.31
Rice Area per Farm	Feddans	1.26	2.08	2.56	2.25	2.06
Rice Area % of Land Holding	Percent	40.13	65.20	47.40	52.60	53.40
Change in Rice Area from Previous Year per Farm	Feddans	0.13	0.30	0.24	0.26	0.24
Total Paddy Produced	mt	151.27	423.1	306.1	240.9	1121.32
Paddy Yield	mt/fd	3.18	2.85	2.55	2.77	2.79
Total Paddy per Farm	mt	3.78	5.88	6.38	6.02	4.31
Subsample as % of All Observations	Percent	20	36	24	20	100.0
Subsample as % of Sampled Rice Area	Percent	14.9	30.5	30.5	24.1	100.0
Subsample as % of Total Paddy	Percent	12.2	36.3	29.7	21.8	100.0

Table 3. Percent of Producers by Reasons for Planting Rice in 1994 by Governorate

Reason	Governorate				All
	Behera	Dakahlia	Kafr El-Sheikh	Sharkia	
	Percent of Producers				
Increase in Government Price	20.0	63.9	16.7	47.5	40.5
Increase in Market Price	77.5	36.1	56.2	17.5	45.5
No Compulsory Quota	32.5	41.7	29.2	55.0	39.5
Comply with Official Rotation	2.5	44.4	4.2	47.5	27.0
Most Profitable Crop	62.5	37.5	56.2	67.5	53.0
For Family Consumption	97.5	88.9	91.7	100.0	93.5
Land only suitable for rice	0.0	0.0	0.0	5.0	1.0
Neighbors plant rice	0.0	0.0	0.0	5.0	1.0
To improve the soil	0.0	0.0	2.1	0.0	0.5

Table 4. Rice Producer Survey, Sample Size, Land Holding, Production, and Yield by Farm Size, 1994

		Size of farm (feddans of rice)				
Item	Units	< = 1	> 1-3	> 3- < 5	> = 5	All
Number of Respondents	Count	87	74	18	21	200
Total Land Holding	Feddans	179.13	271.04	119.75	292.42	862.34
Area of Rice	Feddans	65.38	138.08	69.0	140.25	412.72
Land Area per Farm	Feddans	2.06	3.66	6.65	13.92	4.31
Rice Area per Farm	Feddans	0.75	1.87	3.83	6.68	2.06
Rice Area as % of Land Holding	Percent	43.8	61.1	64.1	56.9	53.4
Total Paddy Produced	mt	187.15	371.92	185.75	376.50	1121.32
Paddy Yield	mt/fd	2.99	2.79	2.72	2.72	2.79
Total Paddy per Farm	mt	2.15	5.03	10.32	17.93	4.31
Subsample as % of All Observations	Percent	43.5	37.0	9.0	10.5	100.0
Subsample as % of All Sampled Rice Area	Percent	15.8	33.5	16.7	34.0	100.0
Subsample as % of Total Paddy Produced	Percent	16.6	33.2	16.6	33.6	100.0

Table 5. Percent of Producers by Reasons for Planting Rice in 1994 by Farm Size Class

Reason	Size Class[2] I	II	III	IV	All
	Percent of Producers				
Increase in Government Price	39.1	40.5	55.6	33.3	40.5
Increase in Market Price	39.9	54.0	38.9	52.4	45.5
No Compulsory Quota	35.6	41.9	55.6	33.3	39.5
Comply with Official Rotation	23.0	27.0	33.3	38.1	27.0
Most Profitable Crop	47.1	52.7	66.7	66.7	53.0
For Family Consumption	92.0	96.0	88.9	95.2	93.5
Land only suitable for rice	1.2	1.4	0.0	0.0	1.0
Neighbors plant rice	1.2	0.0	5.6	0.0	1.0
To Improve the Soil	1.2	0.0	0.0	0.0	0.5

[2] Size Classes are defined as:

I	less than or equal to 1 feddan of rice area
II	greater than 1 and less than or equal to three feddans
III	greater than 3 and less than 5 feddans
IV	greater than or equal to 5 feddans

Table 6. Disposition of Paddy Rice by Utilization Category for Four Farm Sizes, 1994

Utilization Category	Size of Farm (feddans of rice) <=1	>1-3	>3-<5	>=5	All
	Percent of Paddy Produced				
Payment of Production Costs	7.1	5.3	5.6	5.2	5.6
Family Consumption	40.0	25.4	18.0	13.9	22.8
Sales to Village Merchant	48.3	49.8	55.3	39.2	46.9
Sales Outside of Village	0.9	10.8	18.0	34.7	18.4
Sales Outside of Governorate	0.0	1.2	1.6	3.9	2.0
Sales to Cooperative	0.0	1.5	0.0	0.0	0.5
Sales to Government	0.0	0.0	0.0	0.0	0.0
Other Sales of Paddy	3.7	6.0	1.0	3.2	3.9
All Paddy Rice Produced	100.0	100.0	100.0	100.0	100.0
All Paddy Rice Produced, mt	187.1	371.9	185.7	376.5	1121.3

Table 7. Disposition of Paddy Rice by Utilization Category by Governorate, 1994

Utilization Category	Governorate: Behera	Dakahlia	Kafr El-Sheikh	Sharkia	All
	Percent of Paddy Produced				
Payment of Production Costs	9.4	6.1	7.3	10.2	5.6
Family Consumption	25.8	25.4	20.0	19.8	22.8
Sales to Village Merchant	44.6	52.5	41.0	45.9	46.9
Sales Outside of Village	10.7	15.9	15.8	30.7	18.4
Sales Outside of Governorate	3.3	0.0	4.7	1.0	2.0
Sales to Cooperative	0.0	0.0	1.8	0.0	0.5
Sales to Government	0.0	0.0	0.0	0.0	0.0
Other Sales of Paddy	6.1	0.1	9.4	2.3	3.9
All Paddy Rice Produced, mt	100.0	100.0	100.0	100.0	100.0

Table 8. Disposition of Paddy Rice by Producers, All Varieties, 1990-1994

	Percent of total paddy produced				
Item	1990	1991	1992	1993	1994
Payment of Production Costs	8.6	10.2	4.7	6.7	5.6
Family Consumption	32.6	40.9	20.5	27.2	22.8
Private Sector Sales[1]	20.6	28.9	49.9	57.6	71.2
Public Sector Sales	38.2	20.0	24.9	8.4	0.5
Total Disposition	100.0	100.0	100.0	100.0	100.0

[1]Sales to merchants, private millers, and other uses.

Table 9. Price of Paddy Rice by Utilization Category for Four Farm Sizes, 1994

Utilization Category	Size of Farm (feddans of rice) <=1	>1-3	>3-<5	>=5	All
	LE/mt of Paddy[1]				
Payment of Production Costs	587	521	488	457	515
Family Consumption	552	509	463	465	513
Sales to Village Merchant	598	603	594	625	607
Sales Outside of Village	401	632	669	702	680
Sales Outside of Governorate	na	613	510	666	634
Sales to Cooperative	na	370	na	na	370
Sales to Government	na	na	na	na	na
Other Uses of Paddy	415	420	na	600	475
All Paddy Rice Produced	577	578	600	644	605

Notes: [1]All prices are weighted by volume of paddy disposed in each category.

Table 10. Price of Paddy Rice by Utilization Category by Governorate, 1994

Utilization Category	Behera	Dakahlia	Kafr El-Sheikh	Sharkia	All
	Governorate				
	LE/mt[1] of Paddy				
Payment of Production Costs	607	na	452	na	515
Family Consumption	566	na	461	na	513
Sales to Village Merchant	587	595	577	676	607
Sales Outside of Village	533	651	654	757	680
Sales Outside of Governorate	498	na	666	720	634
Sales to Cooperative	na	na	370	na	370
Sales to Government	na	na	na	na	na
Other Sales of Paddy	450	na	486	350	475
All Paddy Rice Produced	566	608	556	707	605

[1]All prices are weighted by volume of paddy disposed in each category.

Table 11. Prices Received by Producers for Paddy Rice, 1990-1994

	LE/mt of paddy				
Item	1990	1991	1992	1993	1994
Private Sector Sales	393	403	421	419	644
Public Sector Sales	319	403	402	360	370

Table 12. Percent of Producers by How they Priced their Rice in 1994 by Governorate

Method	Governorate				All
	Behera	Dakahlia	Kafr El-Sheikh	Sharkia	
	Percent of Producers				
Based on the Variety	37.5	0.0	0.0	0.0	9.4
Cleanliness of Paddy	37.5	0.0	0.0	0.0	9.4
Percent Moisture of Paddy	5.0	0.0	0.0	3.3	1.9
Village Market Price	27.5	8.9	0.0	3.3	10.7
Demand and Supply	30.0	67.9	100.0	40.0	59.8
Paddy Merchants	37.5	25.0	3.0	66.7	31.4
Government Price	5.0	1.8	0.0	0.0	1.9
Total Production	0.0	0.0	0.0	0.0	0.0
Mills	0.0	0.0	0.0	6.7	1.3

Table 13. Percent of Producers by How they Priced their Rice in 1994 by Farm Size Class

Method	Size Class[3] I	II	III	IV	All
	Percent of Producers				
Based on the Variety	18.6	3.6	0.0	0.0	9.4
Cleanliness of Paddy	18.6	3.6	0.0	0.0	9.4
Percent Moisture of Paddy	2.9	1.8	0.0	0.0	1.9
Village Market Price	14.3	8.9	6.2	5.9	10.7
Demand and Supply	55.7	62.5	56.2	70.6	59.7
Paddy Merchants	21.4	37.5	50.0	35.3	31.4
Government Price	1.4	3.6	0.0	0.0	1.9
Total Production	0.0	0.0	0.0	0.0	0.0
Mills	0.0	0.0	6.2	5.9	1.3

[3] Size Classes are defined as:

I	less than or equal to 1 feddan of rice area
II	greater than 1 and less than or equal to three feddans
III	greater than 3 and less than 5 feddans
IV	greater than or equal to 5 feddans

Table 14. Percent of Producers by Source of Rice Market Information in 1994 by Governorate

Source	Governorate				All
	Behera	Dakahlia	Kafr El-Sheikh	Sharkia	
	Percent of Producers				
Village Market	97.5	91.7	95.8	95.0	94.5
Cooperatives	40.0	36.1	37.5	35.0	37.0
Agriculture Supervisor	25.0	11.1	8.3	2.5	11.5
Newspapers	5.0	23.6	29.2	10.0	18.5
Radio	0.0	19.4	0.0	12.5	9.5
Television	0.0	31.9	0.0	7.5	9.5
Neighbors	5.0	2.8	0.0	5.0	3.0
Other Farmers	2.5	0.0	2.1	0.0	1.0
Paddy Merchants	2.5	12.5	20.8	40.0	18.0
Mills	0.0	0.0	0.0	7.5	1.5

Table 15. Percent of Producers by Sources of Rice Market Information for 1994 by Farm Size Class

Source	Size Class[4] I	II	III	IV	All
	Percent of Producers				
Village Market	93.1	97.3	94.4	90.5	94.5
Cooperatives	34.5	43.2	33.3	28.6	37.0
Agriculture Supervisor	13.8	9.5	5.6	14.3	11.5
Newspaper	11.5	17.6	33.3	38.1	18.5
Radio	4.6	13.5	16.7	9.5	9.5
Television	9.2	14.9	16.7	19.1	13.0
Neighbors	3.4	2.7	5.6	0.0	3.0
Other Farmers	1.2	1.3	0.0	0.0	1.0
Paddy Merchants	13.8	16.2	22.2	38.1	18.0
Mills	0.0	1.3	11.1	0.0	1.5

[4] Size Classes are defined as:

I	less than or equal to 1 feddan of rice area
II	greater than 1 and less than or equal to three feddans
III	greater than 3 and less than 5 feddans
IV	greater than or equal to 5 feddans

Table 16. Percent of Producers by Source of Rice Seed in 1994 by Governorate

Source	Governorate				All
	Behera	Dakahlia	Kafr El-Sheikh	Sharkia	
	Percent of Producers				
From Previous Crop	57.5	23.6	33.3	50.0	38.0
PBDAC/Village Bank	17.5	26.4	37.5	32.5	28.5
From Paddy Merchants	20.0	25.0	16.7	15.0	20.0
From Other Farmers	22.5	6.9	27.1	2.5	14.0
Cooperatives	0.0	19.4	0.0	0.0	7.0

Table 17. Percent of Producers by Source of Rice Seed for 1994 by Farm Size Class

Reason	Size Class[5] I	II	III	IV	All
	Percent of Producers				
Previous Crop	39.1	43.2	33.3	19.0	38.0
PBDAC/Village Bank	23.0	25.7	50.0	42.9	28.5
Paddy Merchants	20.7	17.6	11.1	33.3	20.0
Other Farmers	14.9	14.9	16.7	4.8	14.0
Cooperatives	4.6	8.1	5.6	14.3	7.0

[5] Size Classes are defined as:

I	less than or equal to 1 feddan of rice area
II	greater than 1 and less than or equal to three feddans
III	greater than 3 and less than 5 feddans
IV	greater than or equal to 5 feddans

Table 18. Seasonal Marketing Patterns for Egyptian Rice Producers, 1994

Time period Weeks	Weekly Volume, mt	Cumulative Volume, mt	Cumulative Percent
1	0.85	0.85	0.0967591
2 Oct.	6.45	7.3	0.8309902
3	12.35	19.65	2.2368436
4	14.87	34.52	3.9295593
5	52.35	86.87	9.8887839
6 Nov.	69.75	156.62	17.828725
7	72.25	228.87	26.053252
8	95.3	324.17	36.901659
9	86.9	411.07	46.793858
10 Dec.	66.65	477.72	54.380912
11	54	531.72	60.527963
12	37.35	569.07	64.779674
13	40.05	609.12	69.338737
14 Jan.	63.15	672.27	76.527371
15	19.5	691.77	78.74714
16	24.5	716.27	81.53608
17	12	728.27	82.902091
18 Feb.	4.2	732.47	83.380195
19	15	747.47	85.087709
20	8	755.47	85.998384
21	12.25	767.72	87.392853
22 Mar.	31.25	798.97	90.950175
23	4	802.97	91.405512
24	13.25	816.22	92.913816
25	2.3	818.52	93.175635
26 April	3.3	821.82	93.551288
27	0	821.82	93.551288
28	5	826.82	94.120459
29	5.15	831.97	94.706706
30 May	7	838.97	95.503546
31	0	838.97	95.503546
32	0	838.97	95.503546
33	0	838.97	95.503546
34 June	5.5	844.47	96.129634
35	0	844.47	96.129634
36	2	846.47	96.357303
37	24	870.47	99.089326
38 July	8	878.47	100

Table 19a. 1994/95 Rice Dealer Survey Results by Governorate

Data Item	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
Number of Firms Surveyed:	40	40	40	40	120
Percent buying paddy	85	75	75	75	77
Percent buying japonica	100	100	na	100	100
Percent buying filipino	21	40	na	0	16
Percent buying milled rice	25	28	25	45	23

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 19b. 1994/95 Rice Dealer Survey Results by Dealer Size

Data Item	Milled Rice Only	Very Small 0-50 ton	Small 51-100 ton	Medium 101-250 ton	Large > 250 ton	Tota
Number of Firms Surveyed:	37	48	45	28	2	160
Percent buying paddy	0	100	100	100	100	77
Percent buying japonica		100	100	100	100	100
Percent buying filipino		10	11	18	0	16
Percent buying milled rice	100	8	20	0	0	23

Source: 1994/95 Rice Dealer Survey.

Table 20. Total Quantity of Paddy Rice Purchased from Alternative Sources by Egyptian Rice Dealers, 1994/95 Survey, by Governorate

Source	Dakahlia	Kafr El-Sheikh	Sharkia	Total
Japonica		Quantity, mt		
Village Farmer	1398	1107	1125	3630
Other Village Farmer	1057	982	640	2679
Other Rice Dealers	5	70	55	131
Total	2460	2159	1820	6440
Filipino				
Village Farmer	50	55	0	105
Other Village Farmer	125	10	0	245
Total	175	175	0	350
Total, all paddy	2635	2334	1820	6790

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 21. Percent of Paddy Rice Purchases from Alternative Sources by Egyptian Rice Dealers, 1994/95 Survey, by Governorate

Source	Dakahlia	Kafr El-Sheikh	Sharkia	Total
Japonica		Percent of Total		
Village Farmer	57	51	62	56
Other Village Farmer	43	46	35	42
Other Rice Dealers	0	3	3	2
Cooperatives	0	0	0	0
Total	100	100	100	100
Filipino				
Village Farmer	29	31	NA	30
Other Village Farmer	71	69	NA	60
Other Rice Dealers	0	0	NA	0
Total	100	100	NA	100

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent total may not sum to 100% due to rounding errors.

Table 22. Average Paddy Purchases from Alternative Sources by Egyptian Rice Dealers, 1994/95 Rice Survey, by Governorate (mt/dealer)

Source	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
Japonica		mt/dealer			
Villager farmer	45	43	na	40	43
Other Village Farmer	38	45	na	28	37
Other Rice Dealers	5	35	na	18	22
Total	72	72	na	63	69
Filipino					
Village Farmer	50	18	na	0	26
Other Village Farmer	25	20	na	0	22
Total	29	19	na	0	23
Total Paddy	78	78	na	63	73

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Average volumes reported are for dealers who engaged in such activity.

Table 23. Total Paddy Purchases from Alternative Sources by Egyptian Rice Dealers, 1994/95 Survey, by Dealer Size

Source	Very Small 1-50	Small 51-100	Medium 101-250	Large >250	Total
Japonica			Quantity, mt		
Village Farmer	719	1461	1250	200	3630
Other Village Farmer	423	1006	1149	101	2679
Other Rice Dealers	5	66	60	0	131
Cooperatives	0	0	0	0	0
Total	1147	2533	2459	301	6440
Filipino					
Village Farmer	5	25	75	0	105
Other Village Farmer	50	80	115	0	245
Other Rice Dealers	0	59	0	0	0
Total	55	105	190	0	350
Total, all types	1202	2638	2649	301	6790

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 24. Average Quantity of Paddy Purchases from Alternative Sources by Egyptian Rice Dealers, 1994/95 Survey, by Dealer Size

Source	Very Small 1-50	Small 51-100	Medium 101-250	Large >250	Total
Japonica			Quantity/mt		
Village Farmer	20	43	68	250	43
Other Village Farmer	10	28	51	100	37
Other Rice Dealers	5	32	20	0	22
Total Japonica	30	72	129	300	69
Filipino					
Village Farmer	5	25	37	0	26
Other Village Farmer	12	20	35	0	22
Total Filipino	11	21	38	0	23
Total, all types	37	75	139	300	73

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Averages are for those dealers who engaged in such paddy rice trade.

Table 25. Percent of Paddy Purchases from Alternative Sources by Egyptian Rice Dealers, 1994/95 Survey, by Dealer Size

Source	Very Small 1-50	Small 51-100	Medium 101-250	Large >250	Total
Japonica			Percent		
Village Farmer	62	58	51	67	56
Other Village Farmer	37	40	47	33	42
Other Rice Dealers	1	2	2	0	2
Cooperatives	0	0	0	0	0
Total Japonica	100	100	100	100	100
Filipino					
Village Farmer	9	24	40	na	30
Other Village Farmer	91	76	60	na	60
Other Rice Dealers	0	0	0	na	0
Total Filipino	100	100	100	na	100

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

Table 26. Percentage of Paddy Purchases from Alternative Sources by Egyptian Rice Dealers, 1994/95 Survey, by Dealer Size

Source	Very Small 1-50	Small 51-100	Medium 101-250	Large >250	Total
Japonica			Percent		
Village Farmer	20	40	34	6	100
Other Village Farmer	16	38	43	4	100
Other Rice Dealers	4	50	46	0	100
Total Japonica	18	39	38	5	100
Filipino					
Village Farmer	5	24	71	0	100
Other Village Farmer	20	33	47	0	100
Total Filipino	16	30	54	0	100
Total, all types	18	39	39	4	100

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

Table 27. Average Paddy Prices Paid to Alternative Sources by Egyptian Rice Dealers in 1994/95 Rice Survey by Source and Governorate (LE/mt)

Source	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
Japonica					
Village Farmer	572	603	na	549	574
Other Village Farmer	623	642	na	621	629
Other Rice Dealers	600	599	na	802	679
Total	594	621	na	582	599
Filipino					
Village Farmer	550	361	na	na	451
Other Village Farmer	588	508	na	na	549
Total	578	462	na	na	520
Total Paddy	593	608	na	582	597

Source: 1994/95 Rice Dealer Survey.

Note: Average price is weighted by quantities purchased.

Table 28. Average Paddy Prices Paid to Alternative Sources by Egyptian Rice Dealers, 1994/95 Survey, by Dealer Size

Source	Very Small 1-50	Small 51-100	Medium 101-250	Large >250	Total
Japonica			LE/mt		
Village Farmer	569	587	582	450	574
Other Village Farmer	629	611	661	455	629
Other Rice Dealers	600	735	637	na	679
Total Japonica	590	597	619	452	599
Filipino					
Village Farmer	450	340	488	na	451
Other Village Farmer	529	564	548	na	549
Total Filipino	522	510	525	na	520
Total, all types	587	593	612	452	597

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Averages are for those dealers who engaged in such paddy rice trade.

Table 29. Disposition of Paddy Rice Purchased by Egyptian Rice Dealers, 1994/95 Survey, by Governorate

	Dakahlia		Kafr El-Sheikh		Behera		Sharkia		Total	
Disposition	mt	%	mt	%	mt	%	mt	%	mt	%
Sold as Paddy	**1384**	53	**1820**	78	**na**		**1435**	78	**4638**	68
percent	30		39				31		100	
Milled	**1175**	45	**390**	71	**na**		**330**	18	**1895**	28
percent	62		21				17		100	
Stored	**38**	1	**112**	5	**na**		**46**	3	**196**	3
percent	19		57				24		100	
Kept for own use	**35**	1	**11**	0	**na**		**15**	1	**61**	1
percent	57		18				25		100	
Other use	**3**	0	**0**	0	**na**		**9**	0	**12**	0
percent	25		0				75		100	
Total	**2635**	100	**2334**	100	**na**		**1834**	100	**6803**	100
percent	39		34				27		100	

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

Table 30. Disposition of Paddy Rice Purchased by Egyptian Rice Dealers, 1994/95 Survey, by Dealer Size

	Very Small		Small		Medium		Large		Total	
Disposition	mt	%	mt	%	mt	%	mt	%	mt	%
Sold as Paddy	813	68	1873	71	1653	63	300	100	4639	68
percent	17		40		36		7		100	
Milled	320	26	669	25	906	34	0	0	1895	28
percent	17		35		48		0		100	
Stored	46	4	68	3	82	3	0	0	196	3
percent	23		35		42		0		100	
Kept for own use	21	2	31	1	8	0	1	0	61	1
percent	34		51		13		2		100	
Sold to Public mills	1	0	11	0	0	0	0	0	12	0
percent	8		92		0		0		100	
Total	1201	100	2652	100	2649	100	301	100	6803	100
percent	18		39		39		4		100	

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

Table 31. **Percentage of Paddy Rice Sales by Egyptian Rice Dealers by Destination, 1994/95 Survey, by Governorate**

Destination	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
			Percent		
Consumers:					
own village	21	7	11	13	13
other villages	3	0	7	5	4
other gov.	0	2	0	0	1
towns own gov.	4	2	0	6	3
towns other gov.	4	2	0	0	1
Total	32	13	18	24	22
Retailers:					
own village	16	5	37	9	15
other villages	0	6	17	11	8
other gov.	0	2	0	0	1
towns own gov.	0	19	8	10	9
towns other gov.	0	3	0	0	1
Total	16	35	62	30	34
Wholesalers:					
own village	0	0	0	0	0
other villages	4	6	5	24	18
villages other gov.	3	3	3	0	2
towns own gov.	6	30	12	12	16
towns other gov.	3	13	0	10	8
Total	52	52	20	46	44
Totals:					
own village	37	12	48	22	28
other villages	43	12	29	40	30
villages other gov.	3	7	3	0	4
towns own gov.	10	51	20	28	28
towns other gov.	7	18	0	10	10
Total	100	100	100	100	100

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

Table 32. Percentage of Paddy Rice Sales by Egyptian Rice Dealers by Destination, 1994/95 Survey, by Dealer Size

Destination	Very Small 0-25	Small 26-100	Medium 101-350	Large >350	Total
			Percent		
Consumers:					
own village	19	16	7	10	13
other villages	2	3	4	10	4
other gov.	0	0	1	0	1
towns own gov.	6	4	1	0	3
towns other gov.	5	0	1	0	1
Total	32	23	14	20	22
Retailers:					
own village	7	18	20	0	15
other villages	9	11	7	0	8
other gov.	0	2	0	0	1
towns own gov.	15	3	12	20	9
towns other gov.	0	0	2	0	1
Total	31	34	41	20	34
Wholesalers:					
own village	0	0	0	0	0
other villages	19	13	14	60	18
villages other gov.	5	0	4	0	2
towns own gov.	7	21	18	0	16
towns other gov.	6	9	9	0	8
Total	37	43	45	60	44
Totals:					
own villages	26	34	27	10	28
other villages	30	27	25	70	30
villages other gov.	5	2	5	0	4
towns own gov.	28	28	31	20	28
towns other gov.	11	9	12	0	10
Total	100	100	100	100	100

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

Table 33. Average Price Received for Paddy Rice Sold by Rice Dealers, 1994/95 Survey, by Outlet

Outlet	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
			LE/mt		
Consumers	770	733	828	660	742
Retailers	653	651	747	691	697
Wholesalers	607	651	750	600	634
All	667	662	762	641	680

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 34. Average Price Received for Paddy Rice Sold by Rice Dealers to Consumers, by Location, 1994/95

Consumer Location	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
		LE/mt			
Own village	708	739	863	653	730
Villages in own governorate	809	750	767	691	744
Village outside own governorate	na	720	na	na	720
Towns in own governorate	900	737	na	641	741
Towns outside own governorate	950	720	na	na	864
All locations	770	733	828	660	742

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 35. Average Price Received for Paddy Rice Sold by Rice Dealers to Retailers, by Location, 1994/95

Retailer Location	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
		LE/mt			
Own village	653	611	735	726	702
Villages in own governorate	na	707	720	695	709
Village outside own governorate	na	780	na	na	780
Towns in own governorate	na	637	870	653	680
Towns outside own governorate	na	600	na	na	600
All locations	653	651	747	691	697

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 36. Average Price Received for Paddy Rice Sold by Rice Dealers to Wholesalers, by Location, 1994/95

Wholesaler Location	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
		LE/mt			
Own village	na	na	na	596	596
Villages in own governorate	604	780	862	537	613
Village outside own governorate	600	780	856	na	751
Towns in own governorate	544	591	679	627	609
Towns outside own governorate	750	703	na	714	712
All locations	607	651	750	600	634

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 37. Average Price Received for Paddy Rice Sold by Rice Dealers, 1994/95 Survey, by Outlet, by Dealer Size

Outlet	Very Small	Small	Medium	Large	Total
			LE/mt		
Consumers	779	747	673	900	742
Retailers	669	702	684	870	697
Wholesalers	649	641	661	500	634
All	697	686	672	654	680

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 38. Average Price Received for Paddy Rice Sold by Rice Dealers to Consumers, by Location, 1994/95 , by Dealer Size

Consumer Location	Very Small	Small	Medium	Large	Total
		LE/mt			
Own village	730	745	666	900	730
Villages in own governorate	705	769	660	900	744
Village outside own governorate	na	na	720	na	720
Towns in own governorate	803	744	650	na	741
Towns outside own governorate	950	na	720	na	864
All locations	779	747	673	900	742

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 39. Average Price Received for Paddy Rice Sold by Rice Dealers to Retailers, by Location, by Dealer Size, 1994/95

Retailer Location	Very Small	Small	Medium	Large	Total
		LE/mt			
Own village	706	709	696	na	702
Villages in own governorate	650	690	766	na	709
Village outside own governorate	na	780	na	na	780
Towns in own governorate	661	662	626	870	680
Towns outside own governorate	na	na	600	na	600
All locations	669	702	684	870	697

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 40. Average Price Received for Paddy Rice Sold by Rice Dealers to Wholesalers, by Location, by Dealer Size, 1994/95

Wholesaler Location	Very Small	Small	Medium	Large	Total
		LE/mt			
Own village	525	706	800	na	596
Villages in own governorate	638	641	682	500	613
Village outside own governorate	654	na	809	na	751
Towns in own governorate	677	597	611	na	609
Towns outside own governorate	810	738	661	na	712
All locations	675	649	641	661	500

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 41. Paddy Rice Milled by Egyptian Rice Dealers, by Mill Type, 1994/95 Survey, by Governorate

	Dakahlia		Kafr El-Sheikh		Behera		Sharkia		Total	
Paddy Milled by Mill type:	mt	%	mt	%	mt	%	mt	%	mt	%
Commercial Mill	**290**	24	**120**	31	**260**	28	**90**	27	**760**	26
percent	38		16		34		12		100	
Small Village Mill	**855**	71	**0**	0	**665**	72	**241**	73	**1761**	62
percent	49		0		38		13		100	
Own Mill	**58**	5	**270**	69	**0**	0	**0**	0	**328**	12
percent	18		82		0		0		100	
Total Paddy Milled	**1203**	100	**390**	100	**925**	100	**331**	100	**2849**	100
percent	28		7		9		56		100	
Total White Rice	855		254		631		228		1967	
Milling Rate, percent	71.1		65.1		68.2		68.9		69.0	
Avg. Cost Paddy Milling LE/mt	16		22		31		20		22	
Avg. Cost Milling and Polishing LE/mt	19		30		24		27		23	

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

Table 42. Paddy Rice Milled by Egyptian Rice Dealers, by Mill Type, 1994/95 Survey, by Dealer Size

	Very Small		Small		Medium		Large		Total	
Paddy Milled by Mill type:	mt	%	mt	%	mt	%	mt	%	mt	%
Commercial Mill	42	9	165	16	553	43	0	0	760	26
percent	5		22		73		0		100	
Small Village Mill	386	84	737	74	538	42	100	100	1761	62
percent	22		42		30		6		100	
Own Mill	30	7	98	10	200	15	0	0	328	12
percent	9		30		61		0		100	
Total Paddy Milled	458	100	1000	100	1291	100	100	100	2849	100
percent	16		35		45		4		100	
Total White Rice	318		696		886		67		1967	
Milling Rate, percent	69.4		69.6		68.6		67.0		69.0	
Avg. Cost Paddy Milling, LE/mt	23		21		22		25		22	
Avg. Cost Milling and Polishing, LE/mt	24		22		23		28		23	

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

Table 43. Destination of Rice Milled by Egyptian Rice Dealers, 1994/95 Survey, by Governorate

	Dakahlia		Kafr El-Sheikh		Behera		Sharkia		Total	
Destination	mt	%	mt	%	mt	%	mt	%	mt	%
Consumers	154	18	41	16	43	6	118	52	356	18
percent	43		12		12		33		100	
Retailers:										
Own governorate	85	10	60	24	316	48	65	29	526	26
percent	16		11		60		13		100	
Other governorate	187	21	0	0	188	29	20	9	395	20
percent	47		0		48		5		100	
Wholesalers	447	51	153	60	111	17	22	10	733	36
percent	61		21		15		3		100	
Total	873	100	254	100	658	100	225	100	2010	100
percent	43		13		33		11		100	

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

Table 44. Destination of Rice Milled by Egyptian Rice Dealers, 1994/95 Survey, by Dealer Size

	Very Small		Small		Medium		Large		Total	
Destination	mt	%	mt	%	mt	%	mt	%	mt	%
Consumers	108	31	140	20	91	10	17	25	356	18
percent	30		39		26		5		100	
Retailers:										
Own governorate	108	31	204	29	164	19	50	75	526	26
percent	21		39		31		9		100	
Other governorate	32	9	101	14	262	30	0	0	395	20
percent	8		26		66		0		100	
Wholesalers	96	28	270	38	367	41	0	0	733	36
percent	13		37		50		0		100	
Total	344	100	715	100	884	100	67	100	2010	100
percent	17		36		44		3		100	

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent total may not sum to 100% due to rounding errors.

Table 45. Average Price Received by Rice Dealers for Milled Rice (bought as Paddy) by Outlet, 1994/95

Outlet	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
			LE/mt		
Consumers	1024	1133	1202	1058	1072
Retailers	1008	1071	1060	1052	1045
Wholesalers	700	1010	997	854	817
All	850	1044	1058	1035	967

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 46. Average Price Received by Rice Dealers for Milled Rice (bought as Paddy) by Outlet, by Dealer Size, 1994/95

Outlet	Very Small	Small	Medium	Large	Total
			LE/mt		
Consumers	1051	1080	1052	1200	1072
Retailers	1020	1032	1067	1000	1045
Wholesalers	680	767	883	na	817
All	938	941	989	1051	967

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 47. Source of Milled Rice Purchases by Egyptian Rice Dealers, 1994/95 Survey, by Governorate

	Dakahlia		Kafr El-Sheikh		Behera		Sharkia		Total	
Source	mt	%	mt	%	mt	%	mt	%	mt	%
Own Village Farmers	115	31	71	52	29	16	82	46	297	34
percent	39		24		10		27		100	
Other Village Farmers	0	0	5	4	0	0	0	0	5	1
percent	0		100		0		0		100	
Own Village Rice Dealers	147	39	17	12	5	3	3	1	171	20
percent	86		10		3		1		100	
Other Village Rice Dealers	95	25	9	7	117	64	33	18	254	29
percent	37		4		46		13		100	
Own Village Small Mill	15	4	9	0	29	16	15	8	59	7
percent	25		0		50		25		100	
Other Village Small Mill	4	1	0	0	0	0	0	0	4	0
percent	100		0		0		0		100	
Commercial Mill	0	0	35	26	4	2	0	0	39	4
percent	0		90		10		0		100	
Public Mill	0	0	0	0	0	0	47	26	47	5
percent	0		0		0		100		100	
Total	376	100	137	100	184	100	180	100	876	100
percent	43		16		21		20		100	

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent total may not sum to 100% due to rounding errors.

Table 48. Source of Milled Rice Purchased by Egyptian Rice Dealers, 1994/95 Survey, by Size of Dealer

	Milled Rice Only[a]		Very Small		Small		Medium		Total	
Source	mt	%	mt	%	mt	%	mt	%	mt	%
Own Village Farmers	226	31	20	48	51	54	0	0	297	34
percent	76		7		17		0		100	
Other Village Farmers	5	1	0		0		0	0	5	1
percent	100		0		0		0		100	
Own Village Rice Dealers	163	22	0	0	8	9	0	0	171	20
percent	95		0		5		0		100	
Other Village Rice Dealers	217	29	2	4	35	37	0	0	254	29
percent	85		1		14		0		100	
Own Village Small Mill	59	8	0	0	0	0	0	0	59	7
percent	100		0		0		0		100	
Other Village Small Mill	4	1	0	0	0	0	0	0	4	0
percent	100		0		0		0		100	
Commercial Mill	39	5	0	0	0	0	0	0	39	4
percent	100		0		0		0		100	
Public Mill	27	3	20	48	0	0	0	0	47	5
percent	57		43		0		0		100	
Total	740	100	42	100	94	100	0	0	876	100
percent	85		5		10		0		100	

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent total may not sum to 100% due to rounding errors.

[a]Includes dealers who did not purchase paddy rice. Other dealers are classified by size of paddy purchases.

Table 49. Average Price Paid to Alternative Sources for Milled Rice by Egyptian Rice Dealers, 1994/95 Survey, by Governorate

Source	Dakahlia	Kafr El-Sheikh	Behera	Sharki a	Total
			LE/mt		
Own Village Farmers	973	950	1003	1016	982
Own Village Rice Dealers	1009	954	1150	792	1005
Other Village Rice Dealers	1130	1000	673	999	1036
Own Village Small Mill	1100	na	969	1000	1010
Other Village Small Mill	1140	na	na	na	1140
Public Mill	na	na	na	1085	1085
Commercial Mill	na	1016	1150	na	1028
Total	1034	971	985	1026	1012

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Average price is weighted average by quantities purchased.

Table 50. **Average Price Paid to Alternative Sources for Milled Rice by Egyptian Rice Dealers, 1994/95 Survey, by Dealer Size**

Source	Milled Rice Only[a]	Very Small	Small	Total
		LE/mt		
Own Village Farmers	987	945	1109	982
Own Village Rice Dealers	1005	na	na	1005
Other Village Rice Dealers	1042	1100	993	1036
Own Village Small Mill	1010	na	na	1010
Other Village Small Mill	1140	na	na	1140
Public Mill	1073	1100	na	1085
Commercial Mill	1028	na	na	1028
Total	1006	1026	1055	1012

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Average price is weighted by quantities purchased.

[a]Includes dealers who did not purchase paddy rice. Other dealers are classified by size of paddy purchases.

Table 51. Destination of Sales of Rice that was Purchased as Milled Rice by Egyptian Rice Dealers, 1994/95 Survey, by Governorate

Destination	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
			Quantity, mt		
Consumers:					
Own village	48	18	48	75	188
Towns own gov.	109	53	40	62	265
Other gov.	8	20	0	7	35
Total	165	91	88	144	488
Retailers:					
Own village	45	16	0	9	70
Other gov.	60	8	81	26	175
Towns own gov.	1	0	15	0	16
Total	106	24	96	35	261
Wholesalers:					
Own village	35	0	0	0	35
Other village	70	0	0	0	70
Towns other gov.	0	0	0	0	0
Total	105	0	0	0	105
Totals:					
Own village	128	34	48	84	293
Towns own gov.	239	61	121	88	510
Towns other gov.	9	20	15	7	51
Total	376	115	184	179	854

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 52. **Percentage of Sales of Rice that was Purchased as Milled Rice by Egyptian Rice Dealers, by Destination 1994/95 Survey, by Governorate**

Destination	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
			Percent		
Consumers:					
Own village	13	16	26	42	22
Towns own gov.	29	46	22	35	31
Other gov.	2	17	0	4	4
Total	44	78	48	80	57
Retailers:					
Own village	12	14	0	5	8
Other gov.	16	7	44	15	24
Towns own gov.	0	0	8	0	2
Total	28	21	52	20	31
Wholesalers:					
Own village	9	0	0	0	4
Other village	19	0	0	0	8
Towns other gov.	0	0	0	0	0
Total	28	0	0	0	12
Totals:					
Own village	34	30	26	47	34
Towns own gov.	64	53	66	49	60
Towns other gov.	2	17	8	4	6
Total	100	100	100	100	100

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

Table 53. Destination of Sales of Rice that was Purchased as Milled Rice by Egyptian Rice Dealers, 1994/95 Survey, by Dealer Size

Destination	Milled Rice Only[a]	Very Small	Small	Total
		Quantity, mt		
Consumers:				
Own village	114	19	55	188
Towns own gov.	248	7	10	265
Other gov.	35	0	0	35
Total	397	26	65	488
Retailers:				
Own village	65	5	0	70
Other gov.	134	11	30	175
Towns own gov.	16	0	0	16
Total	215	16	30	261
Wholesalers:				
Own village	35	0	0	35
Other village	70	0	0	70
Towns other gov.	0	0	0	0
Total	105	0	0	105
Totals:				
Own village	214	24	55	293
Towns own gov.	452	18	40	510
Towns other gov.	51	0	0	51
Total	717	42	95	854

Source: 1994/95 Egyptian Rice Dealer Survey

[a]Includes dealers who did not purchase paddy. Other dealers are classified by size according to quantity of paddy purchased.

Table 54. Percentage of Sales of Rice that was Purchased as Milled Rice by Egyptian Rice Dealers, by Destination, 1994/95 Survey, by Dealer Size

Destination	Milled Rice Only[a]	Very Small	Small	Total
		Percent		
Consumers:				
Own village	16	45	58	22
Towns own gov.	35	17	11	31
Other gov.	5	0	0	4
Total	55	62	68	57
Retailers:				
Own village	9	12	0	8
Other gov.	19	26	32	21
Towns own gov.	2	0	0	2
Total	30	38	32	31
Wholesalers:				
Own village	5	0	0	4
Other village	10	0	0	8
Towns other gov.	0	0	0	0
Total	15	0	0	12
Totals:				
Own village	30	57	58	34
Towns own gov.	63	43	42	60
Towns other gov.	7	0	0	6
Total	100	100	100	100

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

[a]Includes dealers who did not purchase paddy rice. Other dealers are classified by size of quantity of paddy purchased during the year.

Table 55. Percentage of Sales of Rice that was Purchased as Milled Rice by Egyptian Rice Dealers by Dealer Size, 1994/95 Survey, by Destination

Destination	Milled Rice Only[a]	Very Small	Small	Total
		Percent		
Consumers:				
Own village	61	10	29	100
Towns own gov.	94	3	3	100
Other gov.	100	0	0	100
Total	81	5	14	100
Retailers:				
Own village	93	7	0	100
Other gov.	77	6	17	100
Towns own gov.	100	0	0	100
Total	82	6	12	100
Wholesalers:				
Own village	100	0	0	100
Other village	100	0	0	100
Towns other gov.	0	0	0	0
Total	100	0	0	100
Totals:				
Own village	73	8	19	100
Towns own gov.	89	4	7	100
Towns other gov.	100	0	0	100
Total	84	5	11	100

Source: 1994/95 Egyptian Rice Dealer Survey.

Note: Percent totals may not sum to 100% due to rounding errors.

[a]Includes dealers who did not purchase paddy. Other dealers are classified by size of paddy purchased during the year.

Table 56. Average Price Received by Rice Dealers for Milled Rice (bought as milled) by Outlet, by Dealer Size, 1994/95

Outlet	Dakahlia	Kafr El-Sheikh	Behera	Sharkia	Total
			LE/mt		
Consumers	1185	na	1222	1157	1183
Retailers	1077	na	1140	1000	1091
Wholesalers	1140	na	na	na	1140
All	1142	na	1179	1126	1149

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 57. Average Price Received by Rice Dealers for Milled Rice (bought as milled) by Outlet, by Dealer Size, 1994/95

Outlet	No Paddy	Very Small	Small	All
		LE/mt		
Consumers	1178	1100	1251	1183
Retailers	1117	831	1067	1091
Wholesalers	1140	na	na	1140
All	1089	1112	1186	1149

Source: 1994/95 Egyptian Rice Dealer Survey.

Table 58. Structure Data for Small Egyptian Village Mills, 1994/95

Governorate	# of Mills Sampled	Year Established		Milling Capacity (mt/mo)	
		Range	Average	Range	Average
Dakahlia	21	1936-94	1974	2-300	127
Damietta	2	1940-91	1965	26-700	363
Fayoum	4	1930-94	1967	30-150	90
Gharbia	2	1960-92	1976	120-180	150
Ismailia	1	1978	1978	120	120
Kafr El-Sheikh	21	1940-88	1974	50-350	137
New Valley	3	1987-91	1990	30-60	45
Sharkia	12	1923-90	1962	4-900	155
All	66	1930-94	1972	2-900	137

Source: 1994/95 Egyptian Rice Mill Survey.

Table 59. Operating Data for Small Egyptian Village Mills, 1994/95

Governorate	Avg. No. of Months in Operation[a]		Avg. Vol. of Paddy Rcv'd (mt)[a]	Avg. Months of Full Capacity Utilization[a]	Avg. Percent Capacity Utilization[a]
	1993/94	1994/95		1994/95	
Dakahlia	8.8	8.6	496	3.9	45
Damietta	7.9	7.9	2453	6.8	86
Fayoum	4.0	3.9	163	1.8	46
Gharbia	2.6	3.0	445	3.0	99
Ismailia	6.0	5.0	250	2.8	42
Kafr El-Sheikh	11.7	11.7	783	5.7	48
New Valley	4.0	4.0	87	1.9	48
Sharkia	4.2	4.9	324	2.1	43
All	8.2	8.3	571	4.2	50

[a]Averages weighted by mill capacity.

Source: 1994/95 Egyptian Rice Mill Survey.

Table 60. Paddy Rice Receipts by Source for Small Egyptian Village Mills, 1994/95

	Source							
	Own Governorate				Outside Governorate			
Governorate	Farmers	Wholesalers	Retailers	Total	Wholesalers	Retailers	Total	Total
				mt				
Dakahlia	4293	3330	1900	9523	900	0	900	10423
Damietta	3060	1046	500	4606	200	100	300	4906
Fayoum	482	120	25	627	25	0	25	652
Gharbia	890	0	0	890	0	0	0	890
Ismailia	100	100	50	250	0	0	0	250
Kafr El-Sheikh	16150	0	300	16450	0	0	0	16450
New Valley	185	0	75	260	0	0	0	260
Sharkia	1045	1220	1622	3887	0	0	0	3887
All	26205	5816	4722	36493	1125	100	1225	37718

Source: 1994/95 Egyptian Rice Mill Survey.

Table 61. Percent of Paddy Rice Receipts by Source for Small Egyptian Village Mills, 1994/95

	Source							
	Own Governorate				Outside Governorate			
Governorate	Farmers	Wholesale	Retail	All	Wholesale	Retail	All	All
Dakahlia	41	32	18	91	9	0	9	100
Damietta	62	21	10	94	4	2	6	100
Fayoum	74	18	4	96	4	0	4	100
Gharbia	100	0	0	100	0	0	0	100
Ismailia	40	40	20	100	0	0	0	100
Kafr El-Sheikh	98	0	2	100	0	0	0	100
New Valley	71	0	29	100	0	0	0	100
Sharkia	27	31	42	100	0	0	0	100
All	69	15	12	97	3	0	3	100

Source: 1994/95 Egyptian Rice Mill Survey.

Table 62. Prices and Costs for Small Egyptian Village Mills, 1994/95

Governorate	Avg. Price Paid for Paddy LE/mt[a]	Avg. Price Rcv'd for Milled Rice LE/mt[a]	Avg. Price Rcv'd for Mill Feed LE/mt[a]	Avg. Milling Rate Percent[a]	Avg. Milling Cost LE/mt[a]	Avg. Milling Margin LE/mt[b]
Dakahlia	700	1020	180	68	23	28.2
Damietta	650	1150	250	65	20	165
Fayoum	690	978	194	69	15	30
Gharbia	na	na	213	67	25	na
Ismailia	688	950	300	70	21	46
Kafr El-Sheikh	na	na	202	65	20	na
New Valley	na	na	na	66	36	na
Sharkia	622	995	181	66	36	60
All	679	1020	199	66	24	38

Source: 1994/95 Egyptian Rice Dealer Survey.

[a]Weighted averagy by volume.
[b](Mill Rice Price * Mill Rate) + (Mill Feed Price * (1 - mill rate)) - Mill Cost - Paddy Price.

Table 63. Structure Data for Eight New Private Commercial Rice Mills, 1994/95

Item	Mean	Max	Min	Total
Year Established	1993	1995	1990	na
Capacity (mt/mo)	177	500	50	1415
Rated Capacity	136	400	40	1090

Source: 1994/95 Egyptian Rice Mill Survey.

Table 64. Operating Data for Eight Recent New Private Commercial Rice Mills, 1994/95

Item	Mean	Max	Min	Total
Months in Operation:				
1993/94	7	12	3	na
1994/95	6.9	10	3	na
Volume of paddy received (MT)	1066	2880	250	8530
Months of full capacity utilization	6.7	12	2	na
Percent of capacity utilization (%)	93	150	50	na

Source: 1994/95 Egyptian Rice Mill Survey.

Table 65. Paddy Rice Receipts by Source for New Private Commercial Rice Mills in Egypt, 1994/95

Source	Metric Ton	Percent
Own Governorate:		
Farmers	1190	14
Wholesalers	4620	54
Retailers	1170	14
Total	6980	82
Outside Governorate:		
Farmers	100	1
Wholesalers	1450	17
Retailers	0	0
Total	1550	18
Total	8530	100

Source: 1994/95 Egyptian Rice Mill Survey.

Table 66. Prices and Costs for Eight New Private Commercial Rice Mills in Egypt, 1994/95

Item	LE/Metric Ton
Average price paid for paddy[a]	684
Average price received for milled rice[a]	957
Average price received for mill feed[a]	194
Average milling rate (%)[a]	70.7
Average milling cost[a]	29
Average milling margin	20

[a]Weighted average by volume paddy received.

Source: 1994/95 Egyptian Rice Mill Survey.

Table 67. Structure Data for Ten Private Commerical Rice Mills in Egypt, 1994/95

Item	Mean	Max	Min	Total
Year Established	1970	1992	1935	na
Capacity (mt/mo)	138	400	30	1536
Rated Capacity (mt/mo)	86	175	20	861

Source: 1994/95 Egyptian Rice Mill Survey.

Table 68. Operating Data for Ten Private Commercial Rice Mills in Egypt, 1994/95

Item	Mean	Max	Min	Total
Months in Operation:				
1993/94	7.3	12	2	na
1994/95	7.3	12	3	na
Volume of paddy received (MT)	659	1600	20	6585
Months of full capacity utilization	6.0	10	1	na
Percent of capacity utilization (%)	79	132	25	na

Source: 1994/95 Egyptian Rice Mill Survey.

Table 69. Paddy Rice Receipts by Source for Private Commercial Rice Mills in Egypt, 1994/95

Source	Metric Ton	Percent
Own Governorate:		
Farmers	841	13
Wholesalers	3707	56
Retailers	1127	17
Total	5675	86
Outside Governorate:		
Farmers	660	10
Wholesalers	0	0
Retailers	250	4
Total	910	14
Total	6585	100

Source: 1994/95 Egyptian Rice Mill Survey.

Table 70. Prices and Costs for Ten Private Commercial Rice Mills in Egypt, 1994/95

Item	LE/Metric Ton
Average price paid for paddy[a]	545
Average price received for milled rice[a]	989
Average price received for mill feed[a]	263
Average milling rate (%)[a]	67.8
Average milling cost[a]	29
Average milling margin	181

[a]Weighted average by volume paddy received.

Source: 1994/95 Egyptian Rice Mill Survey.

Table 71. Structure Data for Eight Public Rice Mills in Egypt, 1994/95

Item	Mean	Max	Min	Total
Year Established	1969	1980	1960	na
Capacity (mt/mo)	4938	12,000	1500	39,500
Rated Capacity (mt/mo)	3006	11,000	750	24,050

Source: 1994/95 Egyptian Rice Mill Survey.

Table 72. Operating Data for Eight Public Rice Mills in Egypt, 1994/95

Item	Mean	Max	Min	Total
Months in Operation:				
1993/94	9	12	8	na
1994/95	9	10	5	na
Volume of paddy received (MT)	26,000	51,000	5900	207,900
Months of full capacity utilization	7	10	5	na
Percent of capacity utilization (%)	72	100	58	na

Source: 1994/95 Egyptian Rice Mill Survey.

Table 73. Paddy Rice Receipts by Source for Eight Public Rice Mills in Egypt, 1994/95

Source	Metric Ton	Percent
Own Governorate:		
Farmers	92,700	45
Wholesalers	33,000	16
Retailers	21,300	10
Ministry of Supply	5,000	2
Total	152,000	73
Outside Governorate:		
Farmers	27,900	13
Wholesalers	25,000	12
Retailers	3,000	1
Total	55,900	27
Total	207,900	100

Source: 1994/95 Egyptian Rice Mill Survey.

Table 74. Prices and Costs for Eight Public Rice Mills in Egypt, 1994/95

Item	LE/Metric Ton
Average price paid for paddy[a]	537
Average price received for milled rice[a]	958
Average price received for mill by product[a]	292
Average milling rate (%)[a]	68.7
Average milling cost[a]	
mill only	59
mill and polish	95
Average milling margin	
mill only	154
mill and polish	117

[a]Weighted average by volume paddy received.

Source: 1994/95 Egyptian Rice Mill Survey.

Table 75. Average Operating Data for Four Types of Egyptian Rice Mills, 1994/95

Item	Small Village Mills	Commerical Private Old	Commerical Private New	Pubic Mills
Number Surveyed	66	10	8	8
Average Year Established	1972	1970	1993	1969
Average Capacity (mt/mo)	137	138	177	3006
Average Capacity Utilization (%)	50	79	93	72
Paddy Purchases (mt)	571	659	1066	25,988
from farmers (%)	69	23	15	58
from wholesalers (%)	18	56	71	28
from retailers (%)	12	21	14	11
from Ministry of Supply (%)	0	0	0	2
Average Paddy Purcahse Price (LE/mt)	679	545	684	537
Average Milling Rate (%)	66	68	71	69
Average Milling Cost (LE/mt)				
mill only	24	29	29	59
mill and polish	na	na	na	95
Average Milled Rice Sales Price (LE/mt)	1020	989	957	958
Average Milled Rice By Product Price (LE/mt)	199	263	194	292
Average Milling Margin (LE/mt)	38	181	20	154/117

Source: 1994/95 Egyptian Rice Mill Survey.

Table 76. Structure Data for Four Egyptian Rice Export Firms, 1994/95

Item	Mean	Max	Min	Total
Year Established	1980	1987	1973	na
First Year to Export Rice	1986	1992	1980	na
Maximum Export Capacity (mt)	32,750	100,000	1,000	131,000
1994 Exports	9,650	20,000	600	na
Capacity Utilization	60	100	11	na

Source: 1994/95 Egyptian Rice Export Survey.

Table 77. Purchases, Shipments and Prices for Four Egyptian Rice Export Firms, 1994/95

Item	Metric Ton	LE/mt
Purchases of Milled Rice	17,400	1181[a]
Exports of Milled Rice	17,400	1510[b]

[a]Weighted by volume purchased.
[b]Weighted by volume exported, $444/mt @ 3.4 LE/$.

Table 78. Paddy Rice Farmgate Prices, LE/ton, 1990-94

Governorate	1990	1991	1992	1993	1994
Alexandria			450	500	600
Behera	367	435	450	500	600
Garbia	367	435	450	500	600
Kafr El-Sheikh	341	432	442	500	580
Dakahlia	367	437	455	495	615
Port Saed		437	454	512	620
Demiatta	380	438	457	512	620
Sharkia	400	439	458	514	625
Ismailia	387	438	456	513	623
Menoflia	400	439	440	496	585
Qalubia	407	422	445	497	590
Fayoum	367	437	454	510	615
New Valley		435	450	503	602
In General	367	435	451	505	605

Source: MOALR.

Table 79. Wholesale Prices for White Rice in Cities, LE/ton, by Month, 1991-95

Year	Gov.	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1991	Dakahlia	950	950	950	950	950	950	950	950	950	950	950	950
	Behera	980	980	980	980	980	980	980	980	960	960	960	960
	Giza	1495	1495	1495	1485	1485	1490	1490	1495	1495	1495	1230	1230
	General	1063	1063	1063	1061	1061	1062	1026	1063	1063	1063	1032	1032
1992	Dakahlia	952	960	980	980	980	940	880	880	880	880	880	880
	Behera	960	970	980	980	980	935	880	910	932	932	932	922
	Giza	1223	1223	1223	1223	1135	1085	960	960	960	960	960	955
	General	1038	1145	1047	1048	1049	980	940	940	940	940	940	910
1993	Dakahlia	883	903	913	904	892	914	919	919	919	836	749	785
	Behera	919	930	935	932	935	930	930	930	935	852	749	785
	Giza	950	960	971	971	971	971	971	971	981	981	1028	970
	General	940	941	947	941	935	947	950	952	957	893	847	857
1994	Dakahlia	815	890	940	992	1023	1042	1052	1032	1012	1081	1110	1110
	Behera	805	840	883	1015	1050	1050	1050	1025	1015	1060	1090	1100
	Giza	970	993	1035	1140	1200	1190	1155	1230	1255	1280	1300	1295
	General	870	925	940	1040	1090	1130	1130	1140	1140	1160	1175	1175
1995	Dakahlia	1090	1085	1085	1085	1090							
	Behera	1047	1030	1030	1065	1075							
	Giza	1190	1175	1175	1208	1230							
	General	1220	1212	1212	1220	1230							

Source: MOALR

Table 80. Wholesale Prices for White Rice in Villages, LE/ton, by Month, 1991-95

Year	Gov.	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1991	Dakahlia	920	920	920	920	920	920	920	920	920	920	920	920
	Behera	950	950	950	950	950	950	950	950	930	930	930	930
	Giza	1450	1450	1450	1440	1440	1445	1445	1450	1450	1450	1190	1190
	General	1030	1030	1030	1028	1028	1029	1029	1030	1030	1030	1000	1000
1992	Dakahlia	922	930	950	950	950	910	855	855	855	855	855	855
	Behera	930	940	950	950	950	905	855	883	903	903	903	893
	Giza	1185	1185	1185	1185	1100	1050	930	930	930	930	930	926
	General	1005	1110	1014	1015	1016	950	910	910	910	910	910	880
1993	Dakahlia	855	875	884	875	864	885	890	890	890	810	725	760
	Behera	890	900	905	905	905	900	900	900	905	825	725	760
	Giza	920	930	940	940	940	940	940	940	950	950	995	940
	General	910	911	917	911	905	917	920	922	927	865	820	830
1994	Dakahlia	779	855	900	950	979	997	1007	988	969	1035	1064	1062
	Behera	770	808	845	970	1007	1007	1007	980	970	1015	1045	1060
	Giza	930	950	990	1090	1150	1140	1105	1180	1200	1225	1245	1244
	General	833	885	900	995	1050	1080	1082	1092	1095	1112	1126	1125
1995	Dakahlia	1040	1035	1035	1035	1039							
	Behera	997	980	980	1015	1025							
	Giza	1135	1120	1120	1150	1170							
	General	1162	1155	1155	1161	1172							

Source: MOALR

Table 81. Retail Price for White Rice in Cities, LE/ton, by Month, 1991-95

Year	Gov.	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
1991	Dakahlia	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
	Behera	1030	1030	1030	1030	1030	1030	1030	1030	1010	1010	1010	1010
	Giza	1550	1550	1550	1550	1550	1550	1550	1550	1550	1290	1290	1290
	General	1115	1115	1120	1120	1120	1120	1120	1120	1118	1118	1088	1088
1992	Dakahlia	1000	1010	1030	1030	1030	980	930	930	930	930	930	930
	Behera	1011	1020	1030	1030	1030	980	930	960	980	980	980	970
	Giza	1290	1290	1290	1290	1290	1135	1010	1010	1010	1010	1010	1005
	General	1090	1095	1100	1105	1105	1035	990	1000	1012	1011	1010	1000
1993	Dakahlia	930	950	960	950	960	970	970	970	970	877	785	825
	Behera	970	975	980	980	980	980	980	980	980	897	784	825
	Giza	1000	1010	1020	1020	1020	1020	1020	1020	1030	1030	1080	1020
	General	990	990	995	990	983	995	998	1001	1006	940	885	900
1994	Dakahlia	875	960	1010	1060	1100	1120	1130	1109	1185	1195	1195	1195
	Behera	865	905	950	1090	1130	1130	1030	1100	1090	1140	1215	1190
	Giza	1045	1065	1110	1225	1290	1280	1240	1320	1345	1375	1375	1375
	General	935	997	1010	1120	1180	1210	1215	1225	1230	1250	1265	1265
1995	Dakahlia	1113	1110	1110	1110	1112							
	Behera	1065	1050	1050	1085	1095							
	Giza	1215	1200	1200	1230	1250							
	General	1240	1235	1235	1240	1255							

Source: MOALR

Table 82. Retail Prices for White Rice in Villages, LE/ton, by Month, 1991-95

Year	Gov.	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	DEC
1991	Dakahlia	970	970	970	970	970	970	970	970	970	970	970	970
	Behera	1000	1000	1000	1000	1000	1000	1000	1000	980	980	980	980
	Giza	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1250	1250
	General	1083	1083	1086	1086	1086	1086	1086	1086	1085	1085	1055	1055
1992	Dakahlia	970	980	1000	1000	1000	950	900	900	900	900	900	900
	Behra	980	990	1000	1000	1000	950	900	930	950	950	950	940
	Giza	1250	1250	1250	1250	1250	1100	980	980	980	980	980	975
	General	1058	1063	1068	1069	1070	1000	958	970	982	981	980	970
1993	Dakahlia	900	920	930	920	910	930	940	940	940	850	760	800
	Behera	940	945	950	950	950	950	950	950	950	870	760	800
	Giza	970	980	990	990	990	990	990	990	1000	1000	1050	990
	General	958	959	965	959	953	965	968	971	976	910	862	875
1994	Dakahlia	820	900	950	1000	1030	1050	1060	1040	1020	1090	1120	1118
	Behera	810	850	890	1020	1060	1060	1060	1030	1020	1070	1100	1115
	Giza	980	1000	1040	1150	1210	1200	1160	1240	1260	1290	1310	1309
	General	877	935	948	1050	1109	1135	1138	1150	1153	1170	1185	1185
1995	Dakahlia	1110	1110	1110	1110	1120							
	Behera	1070	1050	1050	1090	1100							
	Giza	1220	1200	1200	1250	1255							
	General	1246	1240	1239	1245	1257							

Source: MOALR

Table 83. Dickey-Fuller and Augmented Dickey Fuller Unit-Root Testing Results for Egyptian Rice Prices

Description	Dates	Levels: Dickey-Fuller[a,b]	Levels: Augmented Dickey-Fuller[a,b]	1st Differenced: Dickey-Fuller[a,b]	1st Differenced: Augmented Dickey-Fuller[a,b]
Monthly Wholesale Urban					
Wholesale Milled Urban Dakahlia	January 1991 to May 1995	-2.1601[a]	-1.2508	-6.2967	-2.6427
Wholesale Milled Urban Behera	January 1991 to May 1995	-2.7200	-2.7200	-6.7995	-1.9509
Wholesale Milled Urban of Giza	January 1991 to May 1995	-2.0058	-2.0058	-6.0445	-3.1208
Wholesale Milled Urban Egypt	January 1991 to May 1995	-1.3115	-2.1515	-5.1325	-1.3496
Monthly Wholesale Rural					
Wholesale Milled Rural Dakahlia	January 1991 to May 1995	-1.9530	-1.2206	-6.2069	-2.3763
Wholesale Milled Rural Behera	January 1991 to May 1995	-2.5329	-2.5329	-6.6578	-1.8192
Wholesale Milled Rural Giza	January 1991 to May 1995	-1.9886	-1.9886	-6.1730	-2.4841
Wholesale Milled Rural Egypt	January 1991 to May 1995	-1.0424	-2.0089	-5.0634	-1.3351
Monthly Retail Urban					
Retail Milled Urban Dakahlia	January 1991 to May 1995	-2.0970	-2.0970	-6.0469	-2.8188
Retail Milled Urban Behera	January 1991 to May 1995	-2.8286	-2.8286	-7.1368	-2.0866
Retail Milled Urban Giza	January 1991 to May 1995	-2.0142	-2.0142	-6.0176	-2.2734
Retail Milled Urban Egypt	January 1991 to May 1995	-1.2826	-1.2826	-5.4320	-1.7277
Monthly Retail Rural					
Retail Milled Rural Dakahlia	January 1991 to May 1995	-1.8482	-1.6439	-5.9574	-2.6129
Retail Milled Rural Behera	January 1991 to May 1995	-2.5211	-2.5211	-6.6064	-1.8128
Retail Milled Rural Giza	January 1991 to May 1995	-2.0069	-2.0069	-6.2400	-2.2386
Retail Milled Rural Egypt	January 1991 to May 1995	-1.0081	-1.8408	-5.2362	-1.4248

[a]Critical values for n = 50 are -2.93 for $\alpha = .05$ and -2.57 for $\alpha = .10$ (Dickey and Fuller)
[b]Lag orders for augmented tests chosen using the minimum value of Akaike's Final Prediction Error (FPE)

Table 84. Johansen Cointegration Test Results for Egyptian Rice Prices

Null Hypothesis	Trace Test	Maximal Eigenvalue Test	Trace Test	Maximal Eigenvalue Test
	Urban		Rural	
----------------Monthly Egyptian Milled Wholesale (Dakahlia, Behera, and Giza)------------------				
H_o:r=0	35.381[a]	20.153[b]	33.906[a]	18.819[b]
H_o:r≤1	15.228	11.867	15.087	12.108
H_o:r≤2	3.362	3.362	2.979	2.979
-------------------Monthly Egyptian Milled Retail (Dakahlia, Behera, and Giza)-------------------				
H_o:r=0	37.013[a]	19.807[b]	38.815[a]	20.860[b]
H_o:r≤1	17.205	13.600	17.956	11.770
H_o:r≤2	3.606	3.605	6.185	8.185
--National Milled Market--				
	Wholesale		Retail	
H_o:r=0	23.994[c]	18.247[d]	26.418[c]	18.170[d]
H_o:r≤1	5.697	5.697	8.249	8.249

[a]Critical values for the 5% level are 31.256 (H_o:r=0), 17.844 (H_o:r≤1), and 8.083(H_o:r≤2)
[b]Critical values for the 5% level are 21.279 (H_o:r=0), 14.595 (H_o:r≤1), and 8.083(H_o:r≤2)
[c]Critical values for the 5% level are 17.844 (H_o:r=0), and 8.083 (H_o:r≤1)
[d]Critical values for the 5% level are 14.595 (H_o:r=0), and 8.083 (H_o:r≤1)
*Optimal lag orders determined by log likelihood tests

Figure 1. Seasonal Marketing Patterns by Egyptian Rice Producers, 1994

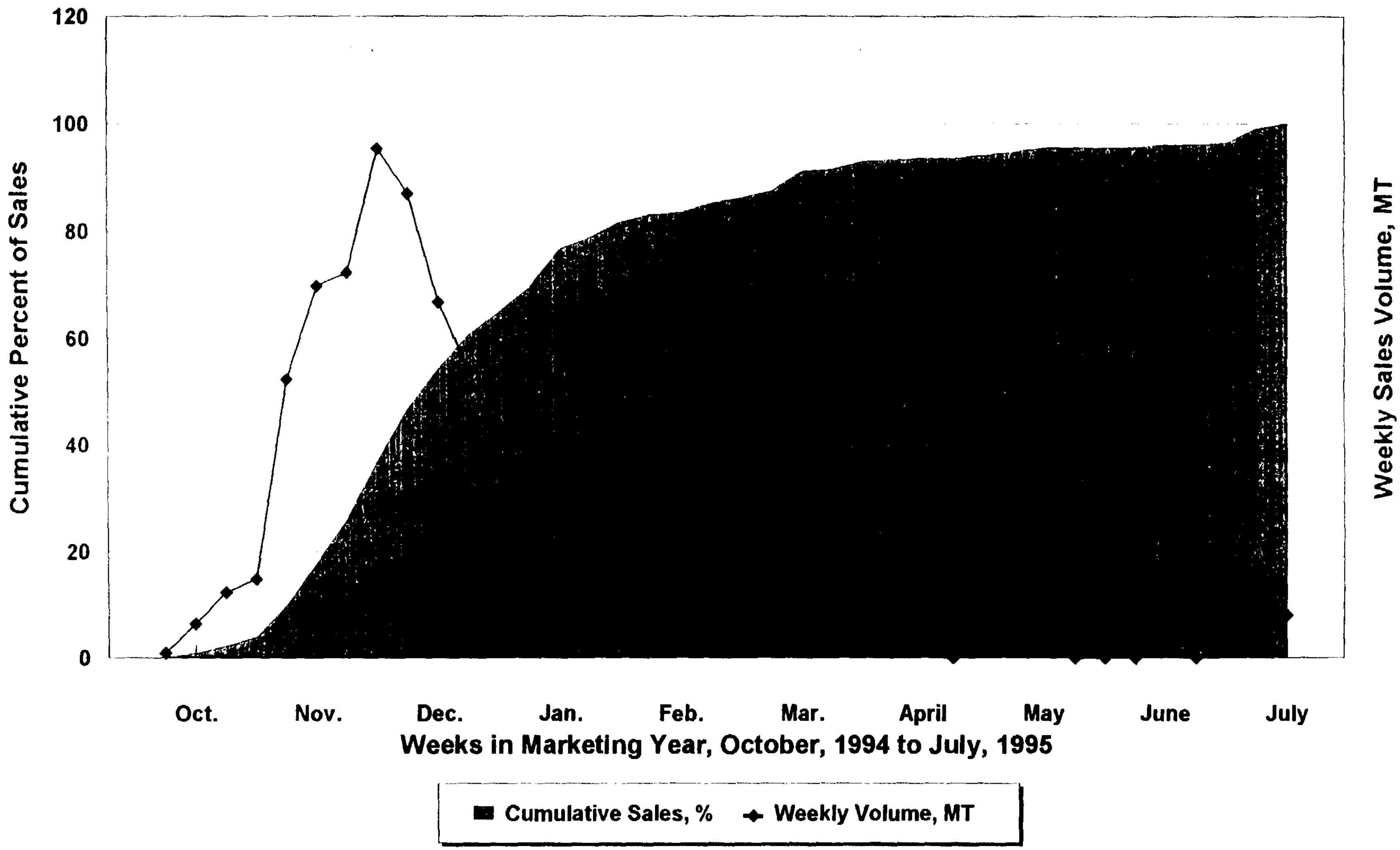

Figure 2. Egyptian Paddy Rice Farmgate Prices, 1990-94.

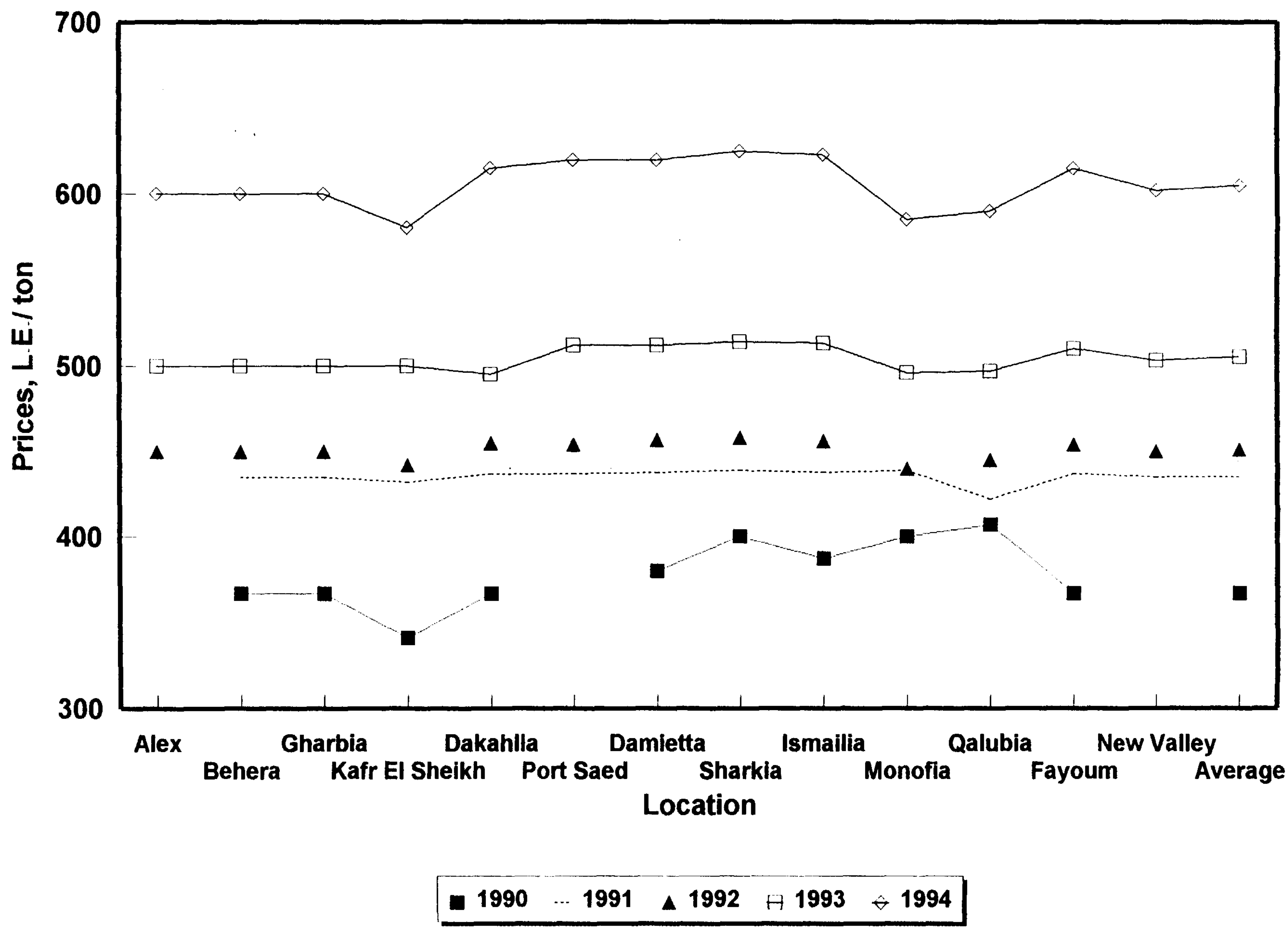

Figure 3. Egyptian Milled Rice Wholesale Price, Villages, 1991-95, by Month.

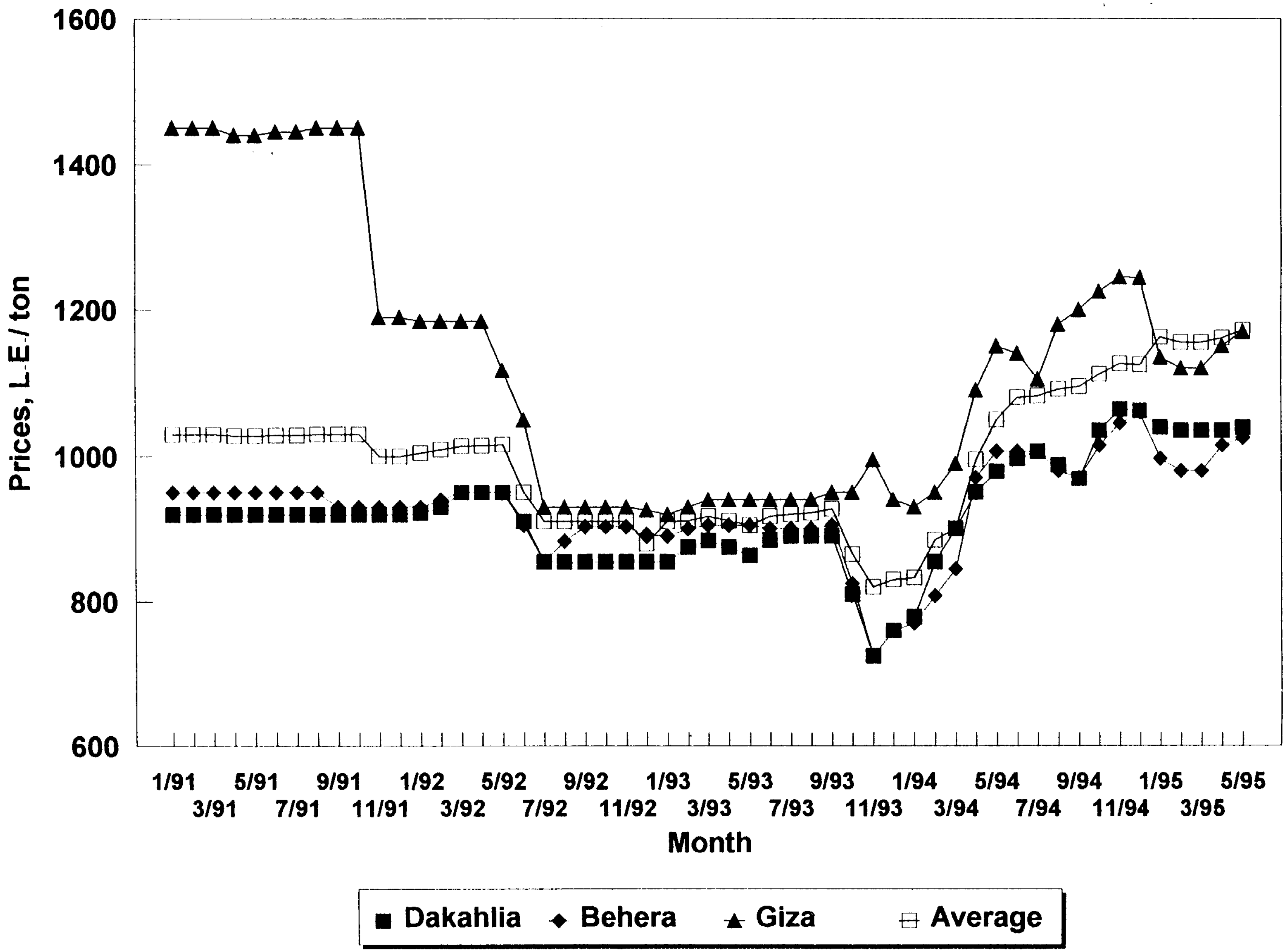

Figure 4. Egyptian Milled Rice Wholesale Price, Cities, 1991-95, by Month.

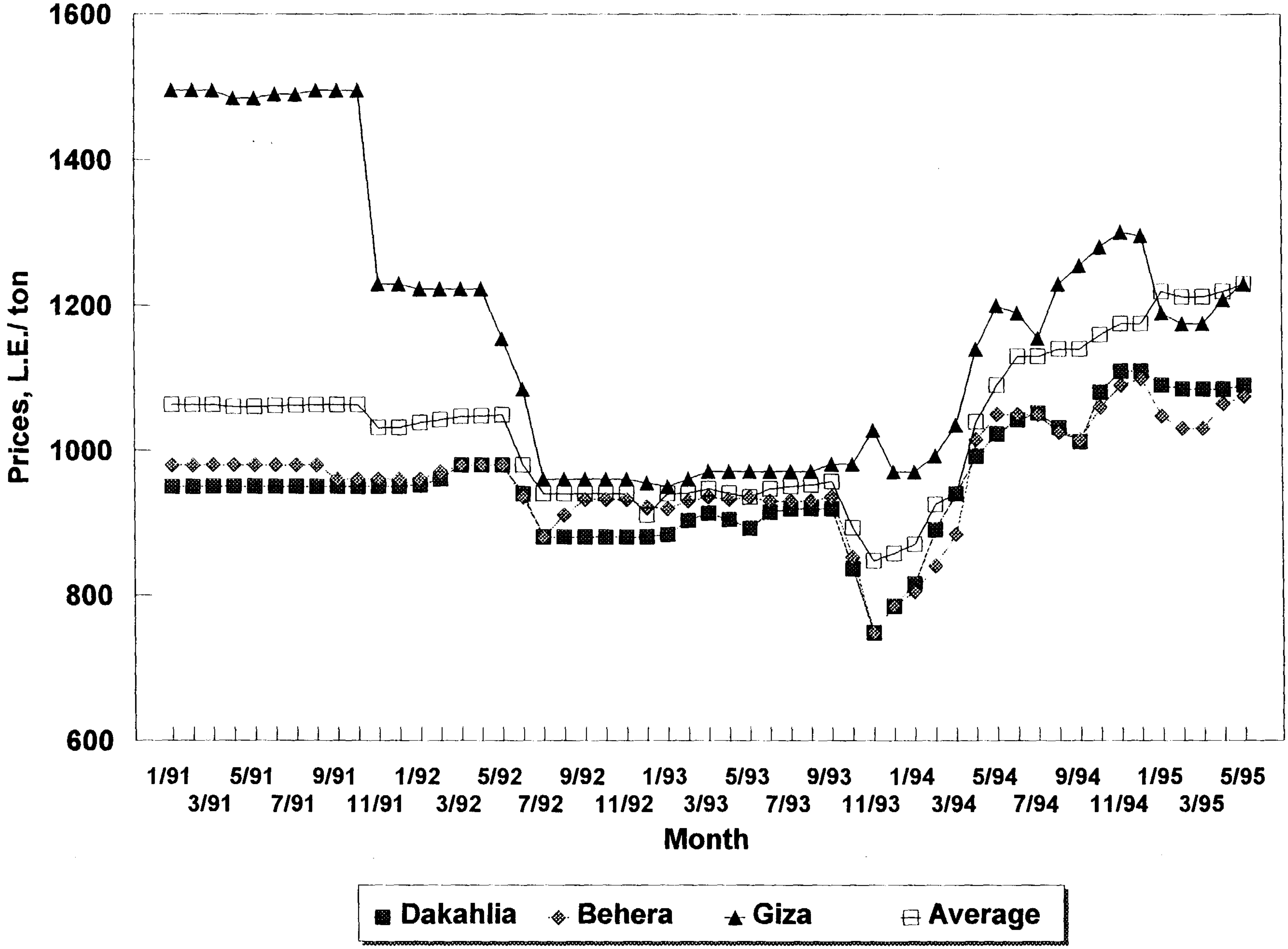

Figure 5. Egyptian Milled Rice Retail Prices, Villages, 1991-95, by Month.

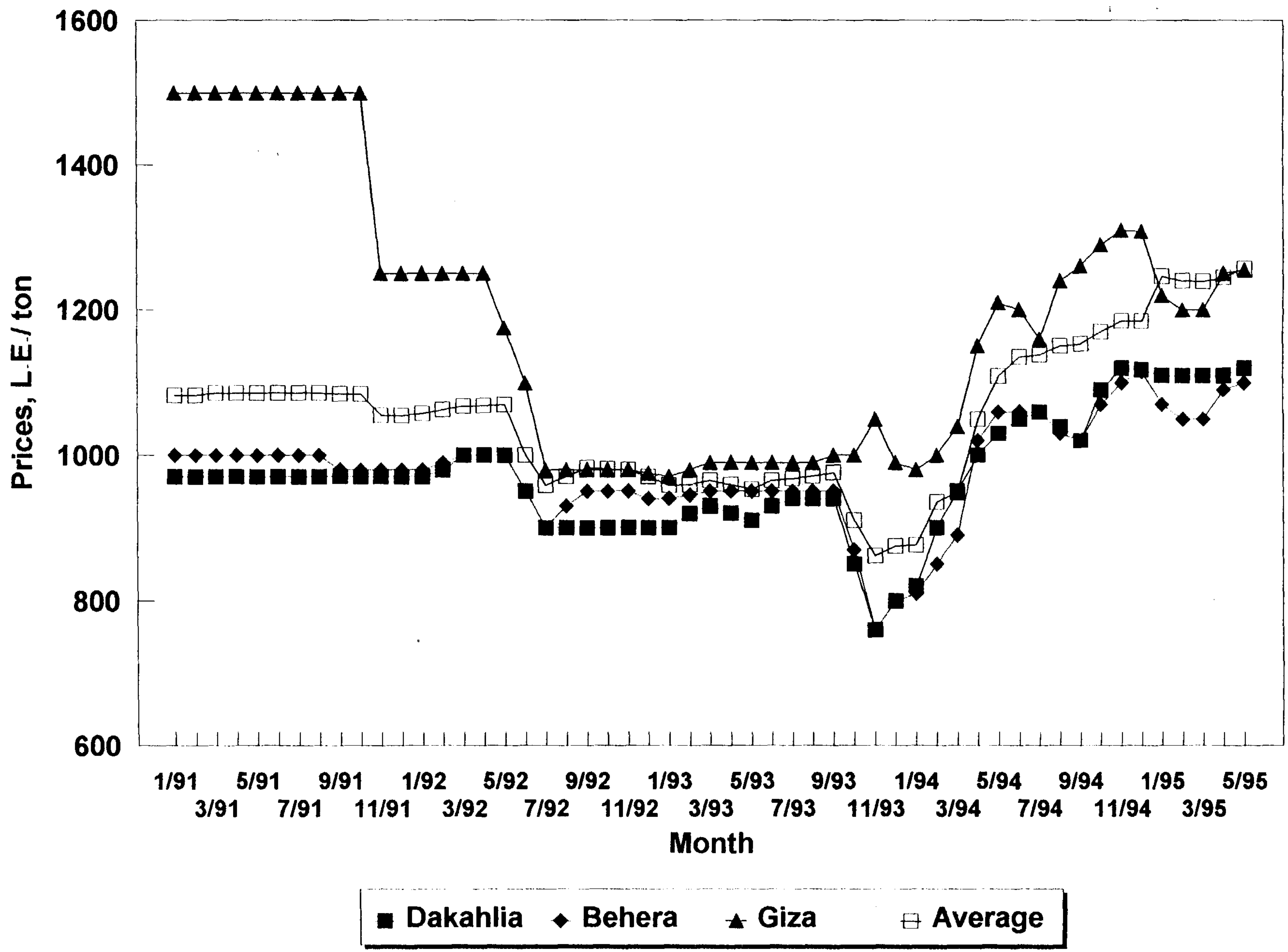

Figure 6. Egyptian Milled Rice Retail Prices, Cities, 1991-95, by Month.

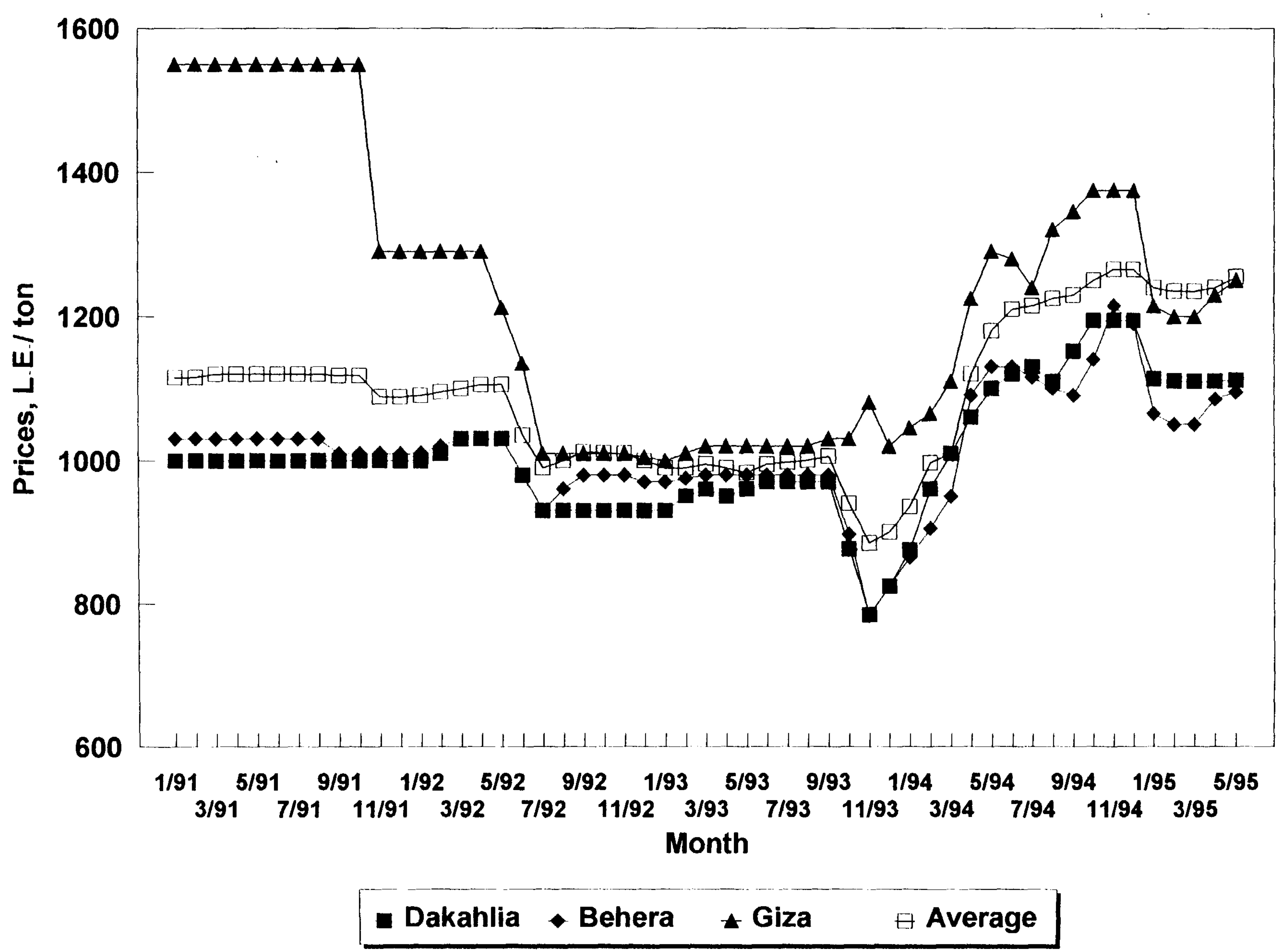

Figure 7. Egyptian Milled Rice Wholesale Price Margin, Cities, 1991-95, by Month.

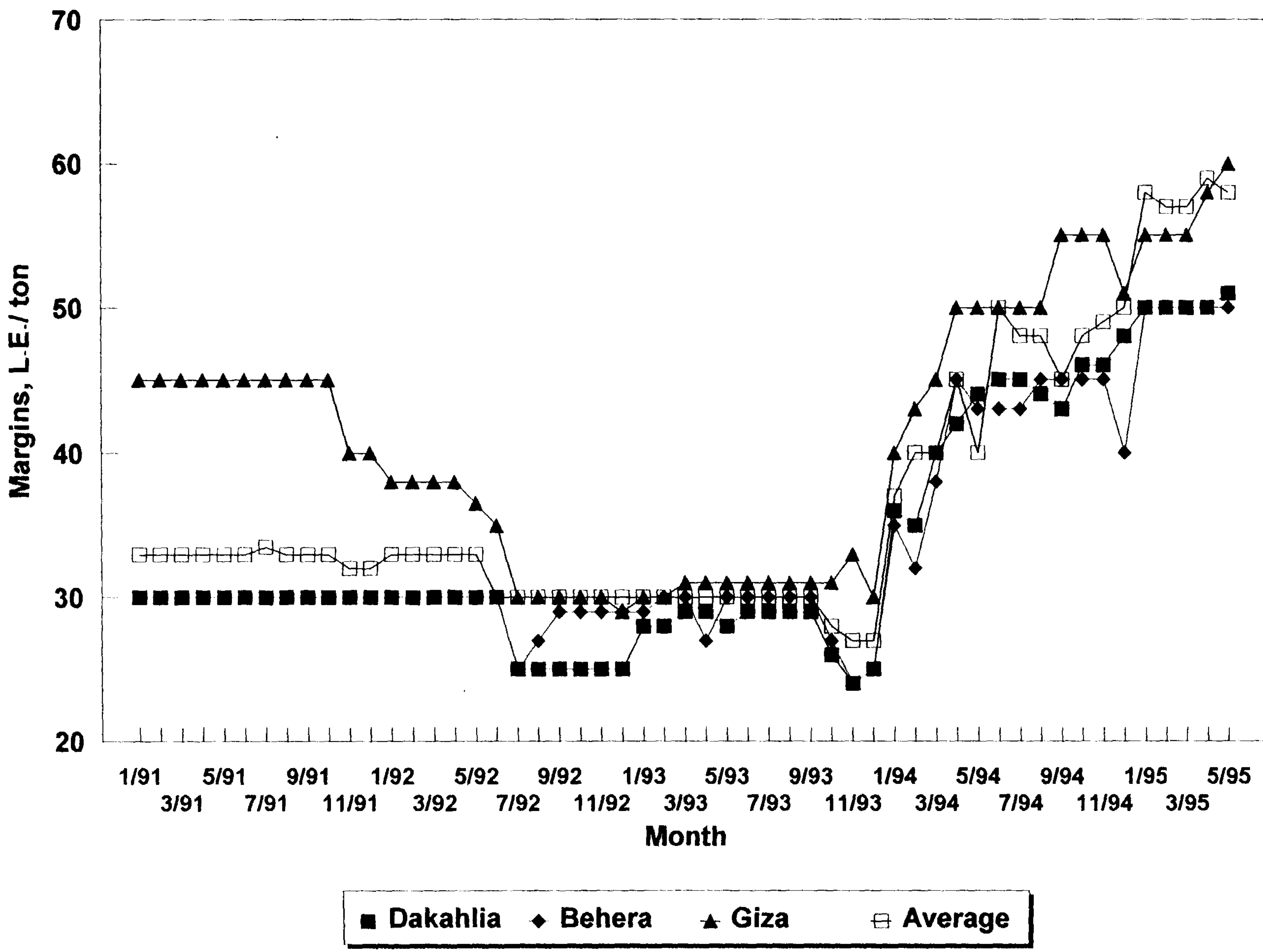

Figure 8. Egyptian Milled Rice Retail Price Margins (Cities-Villages), 1991-95, by Month.

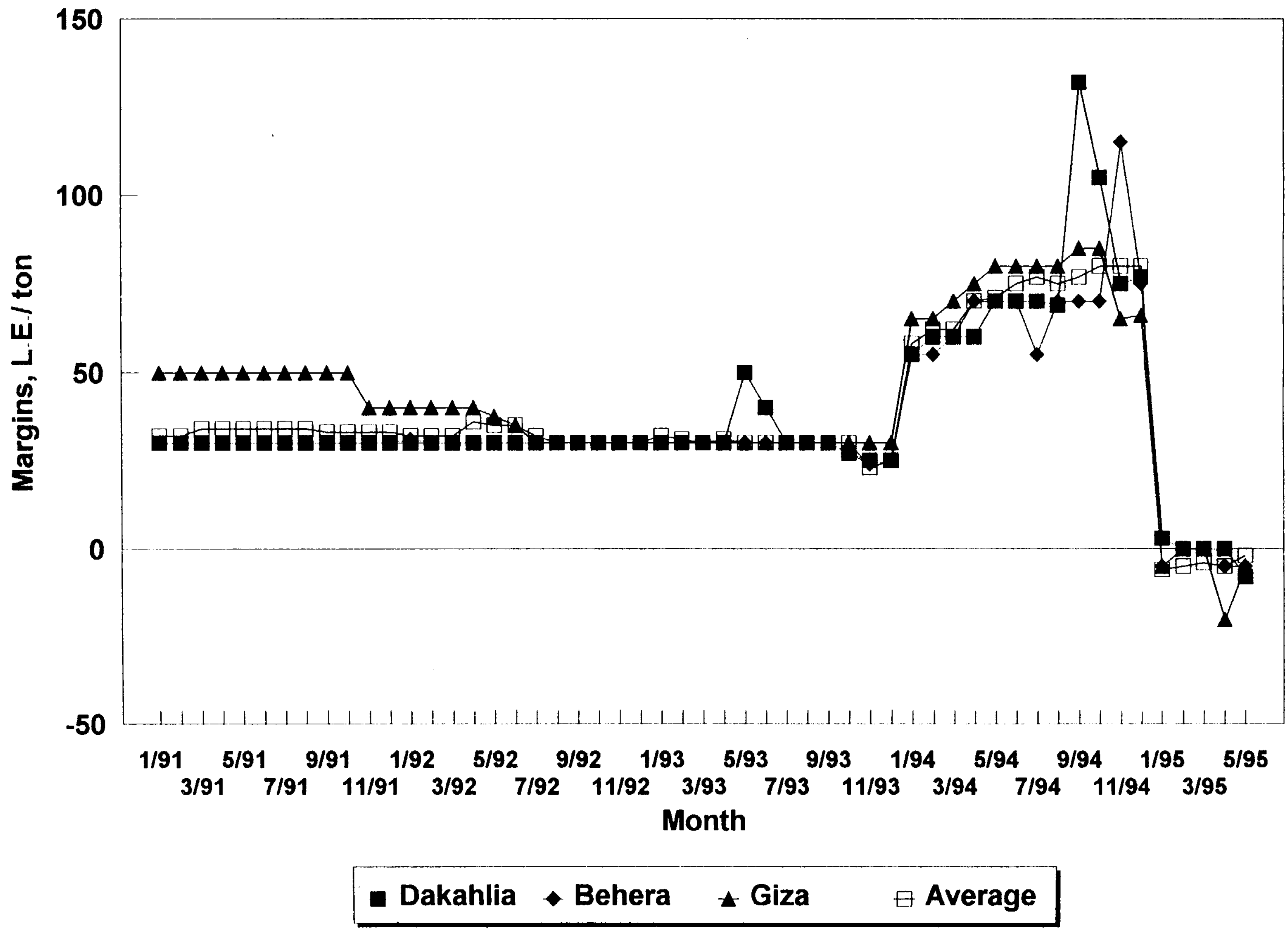

Figure 9. Egyptian Milled Rice Retail-Wholesale Price Margins, Villages, 1991-95, by Month.

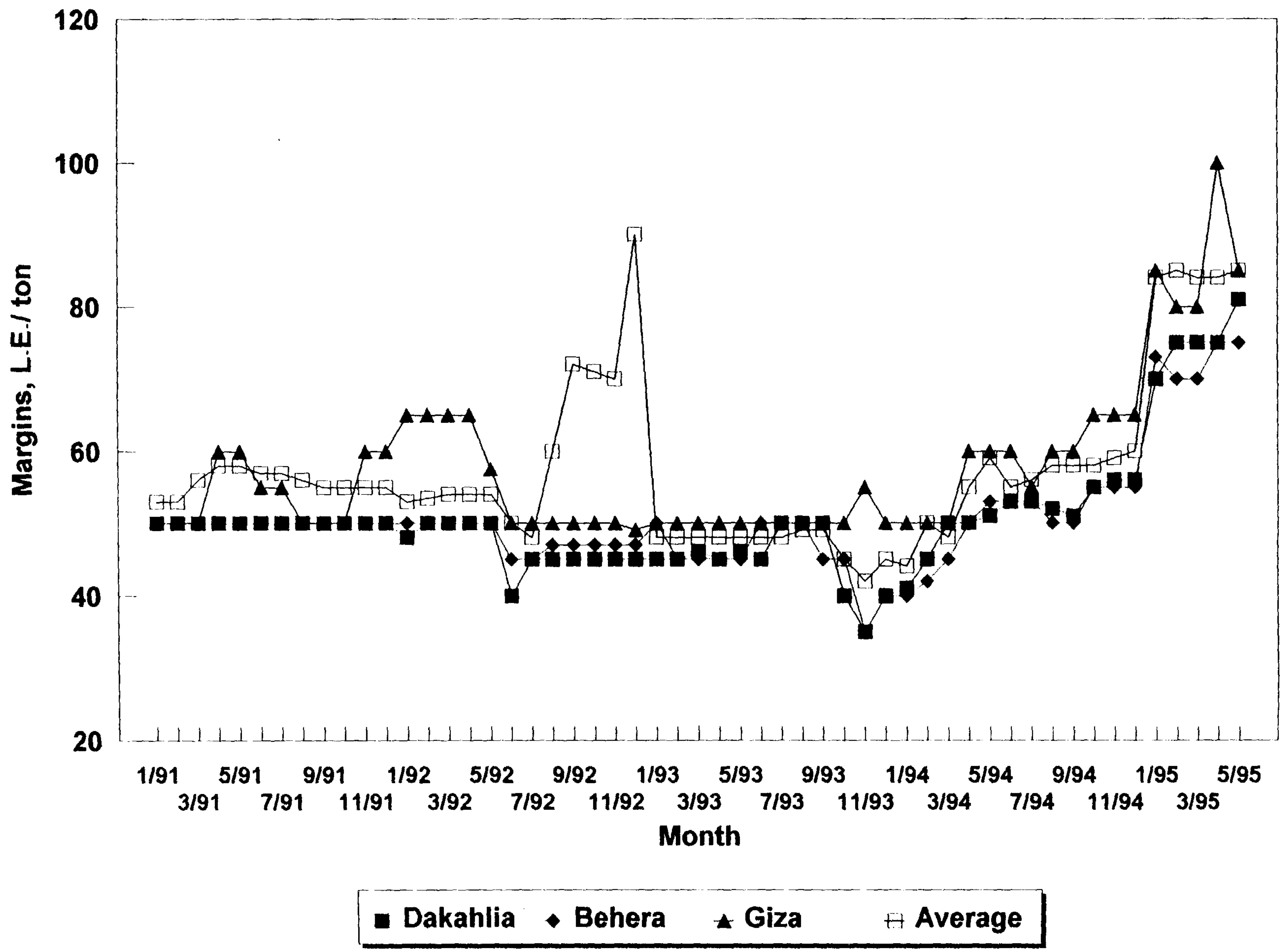

Figure 10. Egyptian Milled Rice Retail-Wholesale Price Margins, Cities, 1991-95, by Month.