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SHORT COMMUNICATION :

Variation of Daily Fish Prices at On-Shore Seeb Market

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ABSTRACT

The on-shore fish market at Seeb is one of the largest fish landing areas in the Muscat region of Oman. Fish buyers at this on-shore fish market suggest that prices are higher on weekend days (Thursday and Friday) than they are during the rest of the week.

The study reported here is one to test the hypothesis of higher prices on weekend days of six species of fish at the on-shore market at Seeb. The analysis used graphical and statistical methods. The graphical analysis used simple average prices as well as simple averaged prices and quantities relatives to identify short term daily price variations. The statistical analysis utilized linear regression models to identify price differentials between weekend days and weekdays.

The results indicate that positive price differentials between weekend days and weekdays are statistically significant for King Fish, Yellow Fin Tuna, Long Tail Tuna and Squid. There was not a statistically significant difference in the daily prices for Silver Grunt and Sardines. The results revealed most of the price differences occurred on Thursday, which is a food major shopping day for the area.

Key Words : On-shore fish prices, artisanal fish marketing, price differential, daily price analysis,

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INTRODUCTION

The on-shore Seeb fish market is one of the largest landing areas in the Muscat region of Oman. Many fishermen bring their daily catch to this market and many truckers come to sell the fish they buy from other landing points or to get supplies of fish for sale at interior markets. Consumers are the main buyers. Various forms of buyers-sellers' interactions take place in this market and the outcome meets the requirements of efficient market conditions. A previous study of the structure-conduct and performance of this market showed that most conditions of workable competition prevail as there are many small buyers and sellers. There is good communication between buyers and sellers and free trade prevails (Omezzine, 1992).

The supply side is characterized by a fairly large number of small fishing units, and sometimes truckers (fish dealers). In general all sellers are small and there is no evidence of selling concentration (Omezzine, 1992).

Retailers are important buyers in the market. They buy from the fishermen and less often from truckers to sell to consumers in a retailing outlet organized in an open area on the sea shore. These outlets are relatively large in number but are small in size with limited operating capacity. Consumers or households make up the largest number of buyers in this market. Their individual buying capacity is very limited compared to retailers and truckers. This puts them in a weak competitive position when they buy directly from the fishermen. The number of consumers in the market on a given day is relatively large. However, this number is greater on the weekends.

The Seeb market falls under the classification of an open and free market system. Trade takes place through individual negotiation or by auction. In the case of individual negotiation, also called direct selling or open bargaining, prices are set by the seller and then subjected to open bargaining. When sales take place by auctioning, fish are sold to the highest bidder in an open auction conducted by auctioning, fish are sold to the highest bidder in an open auction conducted by a recognized market auctioneer. Fish are auctioned whole, one at a time, for large species; by string for medium size fish; and by piles for small size fish. Sometimes, the mixture of the above are auctioned by basket. In general, price discovery made through individual negotiations or by auction meet Breimyer's criteria for efficient pricing (Omezzine, 1992).

OBJECTIVE

A prevalent view reveals that fish prices at Seeb market are higher during the weekends (Thursdays and Fridays) than during the other days of the week. This view is expressed more often by consumers but not well recognized by fishermen. Consumers (locals and expatriates) claim that prices vary with day of the week and are higher on weekends. However, many buy their weekly supply during weekends.

The objective of the paper is to determine daily variation in fish and test the hypothesis that fish prices are higher during weekends. Data used in the analysis was obtained directly from special price reporters at the market, fishermen, auctioneers, retailers, truckers and consumers for the period of December 1992 to June 1993.

Theoretical Considerations and Methodology

Prices play a central role in economic activity in guiding production, distribution and consumption (Tomek and Robinson, 1981). Prices are a result of interactions between buyers and sellers trading a specific product and are an important dimension of market performance. Technically, prices are viewed as a result of a given market structure in which the process of price discovery involves many structural factors, such as the number and size of seller and/or buyer (Breimeyer, 1976). Specific prices at given time period are obtained as negotiations and trade take place among buyers and sellers. Hence, prices may change from one period of time to another with changes in temporal factors.

Price variability of fresh products may be attributed to the biological nature of the production process which makes output partly dependent on certain events including fish stock population and weather. The price elasticities (own price and cross elasticities) of supply and demand will also affect the quantity of fish traded. However, short time price fluctuations, with little or no relation to the longer run price variations, lasting comparatively short periods of time, are commonly caused by temporary changes in the determinants of supply and demand (Working, 1958). It is often hypothesized under unconstrained competition that short-term prices (daily prices) respond a great deal to day-to-day changes in supply and demand.

Variations in daily receipts are known for perishable products. The effect of prices of varying market receipts is sometimes quite marked. Perishable and semi-perishable products which are not stored easily by producers or distributors must be moved into consumption as they are received at the market. When quantities are increased,

consumers will take the greater quantities only at reduced prices. When market quantities fall off, higher prices result.

Temporary changes in demand is another cause of short term price fluctuations. However, demand rests basically upon the desire to consume, purchasing power, and the operation of the possible of diminishing marginal utility. Obviously these three elements of demand are not likely to change frequently. Thus, demand is steady from one day to another and even for much longer periods. For this reason, short-time fluctuations in price are usually due to changes in supply rather than changes in demand. However, there are exceptions to this where demand for specific products is affected by regular known consumption and purchasing habits. For example, meat consumption in Oman increases remarkably during some Moslem holidays.

Analysis of short term price fluctuations serves many useful purposes for many groups. Such analysis is used for :

* Explaining current price conditions
* Forecasting prices
* Clarifying old or establishing new values and prices
* Making administrative decisions
* Suggests changes in selling patterns to maximize total revenue, particularly for highly perishable product.
* Suggests changes in purchasing pattern to minimize total costs.

Price analysis refers to the quantitative study of demand and supply price relationships over time. The analysis includes the construction of tables and graphs, and the use of advanced quantitative tools to evaluate the relationships between dependent and independent variables (Johnson, 1972; Judge, 1977; Maddala, 1977).

There are several alternative techniques for price analysis. These include qualitative, semi-quantitative and quantitative methods (Thomsen, 1936).

However, most of the empirical price analysis methodology developed in the literature is concerned with long-run price movements as well as seasonal and annual price trends. There has not been much methodology developed specifically for analysis of short-time price fluctuations. For this reason, methods of analyzing seasonal variations are often adopted to the analysis of daily or other short-time price variation. These methods include specifically the simple average, index numbers, and moving averages. All these methods use graphical

representations of prices over time to identify trends or other persistent patterns of behavior. These methods could be supplemented by fitting linear trend lines or harmonic functions to the data using regression analysis (Tomek and Robinson, 1981; Waugh, 1964).

Other possible methods of analyzing short-time price variations (daily prices) come under quantitative or statistical procedures for price analysis. They range from the use of confidence intervals for average prices and comparisons of statistical variations of prices to correlation studies designed in the analysis of daily fluctuations between prices and receipts or whatever other measures of short time supply and demand forces. These methods provide a more refined explanation of price variation over time. In addition to pointing the direction of price movement they also indicate the amount of this price movement.

This paper uses statistical procedures for price analysis. Daily prices and quantities supplied by fishermen and truckers of six different fish species - King Fish, Yellow Fin Tuna, Long Tail Tuna, Silver Grunt, Squid and Sardines, - were collected from direct sources at the Seeb market from the period of December 1992 to June 1993. The prices obtained are those received by fishermen expressed in Omani Rial (R.O) per unit. These prices were converted in R.O./kg. The size of fish units and of daily quantities landed were estimated by the surveyors as there is no weighing system in this market.

First, simple daily averages as well as price and quantity simple relatives were calculated and plotted against the day of the week to identify temporal differentials and for any consistency with hypothesized negative relationships between daily price variations and daily quantities supplied.

Second, the regression procedure, bivariate price relationship, was used to study price differentials between week-end days and other days of the week. The relationship between prices and day of the week (weekend or non weekend days) is expressed as follows :

$$P_T = \beta_0 + \beta_1 T + \varepsilon_T$$

Where :

P_T is the price during a predefined period T of the week.
T is a given period of the week days with :
T = 1 for weekend days
T = 0 for other week days
β_0 is the average price for week days (T = 0)

β_1 is the price premium (differential) on week-end days.

Monke and Petzel (1984) tested for integration of international cotton markets based on price behaviour of differentiated products using similar methodology. They indicated four different combinations of the simple linear regression equation parameters β_0 and β_1 to test for price equalities or consistency of premiums and discount resulting from quality differences. Omezzine (1985) used the same procedure to test price differentials in various fresh vegetable markets in Tunisia. Variable T is used in this case as a proxy for two time periods during which prices of the same products are assumed to be different.

This relationship indicates that statistically identical prices during weekends and week days require to test for $\beta_0 = 0$ and positive and $\beta_1 = 0$. However, statistically greater prices during the weekends require $\beta_0 \neq 0$ and positive and $\beta_1 = 0$ and positive (for $\beta_1 \neq 0$ but negative, prices during weekend days are lower than prices during other days of the week).

This relationship is then used to test the basic hypothesis stated as follows :

$$H_0 : P_1 = P_0$$
$$H_1 : P_1 > P_0$$

Where P_1 is the price on weekend days and P_0 is the price on other days of the week.

The basic model was estimated for T=1 on Thursdays and Fridays and T = 0 otherwise. However, three extensions of this model were defined and estimated for 3 different definitions of T=1 to test for price differentials when :

1. T=1 on Thursdays only and equal to zero otherwise.
2. T=1 on Fridays only and equal to zero otherwise.
3. T=1 on Wednesdays, Thursdays, and Fridays and zero otherwise.

RESULT AND DISCUSSION

Plots of daily average prices, shown in Figure 1 reveals absolute price variations with a peak average on Thursdays for all species, except sardines, and are higher than total average on Fridays and in few cases on Wednesdays.

Likewise, the typical daily variation of prices and quantities of various fish species are shown in Figures 2-7 where daily prices and quantities were calculated based on daily averages for a period of one year and expressed as percentages of the average daily averages. These percentages are called price and quantity simple relatives or simple index numbers (Thomsen, 1936).

These plots indicate that prices are :

*about 15 to 25%	higher than the total average for King Fish on Wednesdays, Thursdays, and Fridays.
*5 to 35%	higher than the total average for Yellow Fin Tuna on Wednesdays, Thursdays, and Fridays.
*about 15%	higher than the total average for Long Tail Tuna on Wednesdays, Thursdays, and Fridays.
*More than 15%	higher than the total average for Silver Grunt on Thursdays and Fridays.
*20%	higher than the total average for Squid on Thursdays and Fridays.

However, the daily price movements identified above are not all in accord with the hypothesized assumption that daily prices change negatively with the supply of the day.

Results from regression analysis are shown in Table 1 to 4. Test of significance of parameters are all at a 95% confidence interval.

The first model defined Thursdays and Fridays as weekend days. The results of the analysis indicate positive price differentials for all species with the exception of Silver Grunt and Sardines. All $ß_0$ parameters are significantly greater than zero. $ß_1$ parameters are statistically different from zero and positive for King Fish, Yellow Fin Tuna, Long Tail Tuna and Squid indicating a statistically significant positive price differential between Thursdays and Fridays, and the other days of the week. $ß_1$'s in the Squid and Sardines models are statistically equal to zero suggesting on price differentials between Thursdays and Fridays and other days of the week.

Extensions of the model with different definitions of weekend days confirmed the conclusion of higher prices during weekends. However, most of the price differentials occurs on Thursdays. The regression results shown in Table 2 defined for Thursday as the only weekend day, indicate that all β_0 parameters are statistically positive for

King Fish, Yellow Fin Tuna, Long Tail Tuna and Squid suggesting significant price differential on Thursdays compared to other days of the week. Sardines and Silver Grunt results do not indicate any price differentials under this case.

The regression results shown in Table 3 indicate that β_1 parameters of models where Fridays are the only week-end day are statistically equal to zero except for Squid indicating no price differentials on Fridays compared to other days of the week.

When Wednesdays were included with Thursdays and Fridays as weekend days there were no changes in the conclusions except for the significant price differential of Silver Grunt. Table 4 shows the regression results of the model when Wednesdays, Thursdays and Fridays are weekend days. All β_0's are significantly positive and β_1's are also significantly positive except for Sardines.

CONCLUSION

It is concluded that fish prices at the on-shore Seeb market are significantly higher on the weekends than on other days of the week for all species except Silver Grunt and Sardines. However, regression analysis indicate that most of the price differentials occur on Thursdays.

Price and quantity of the day moved in the same direction indicating a change in prices resulting from a change in demand. This inference is compatible with the basic assumption of increased fish demand during the weekends at the on-shore Seeb market.

The results are useful to the artisanal fishermen as they attempt to maximize their income through sales of fish at the Seeb as well as other on-shore markets in the region. They are also useful to buyers as they would prefer to purchase at the lowest possible price.

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Fig. 1. Daily average price of King Fish, Longtail Tuna, Sardines Silver Grunt, Squid, and yello Fin Tuna.

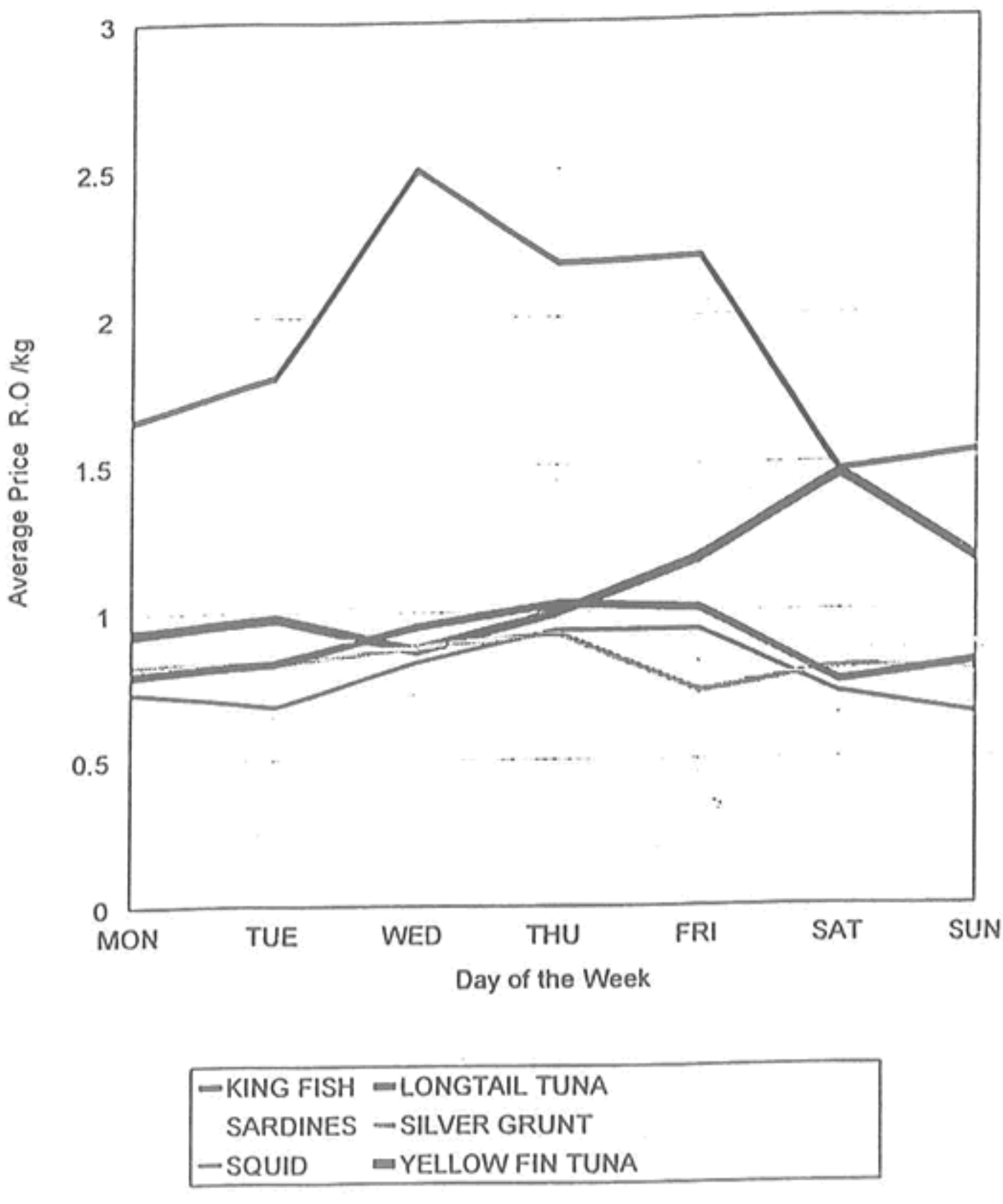

Fig. 2. King Fish Simple price and Quntity relative.

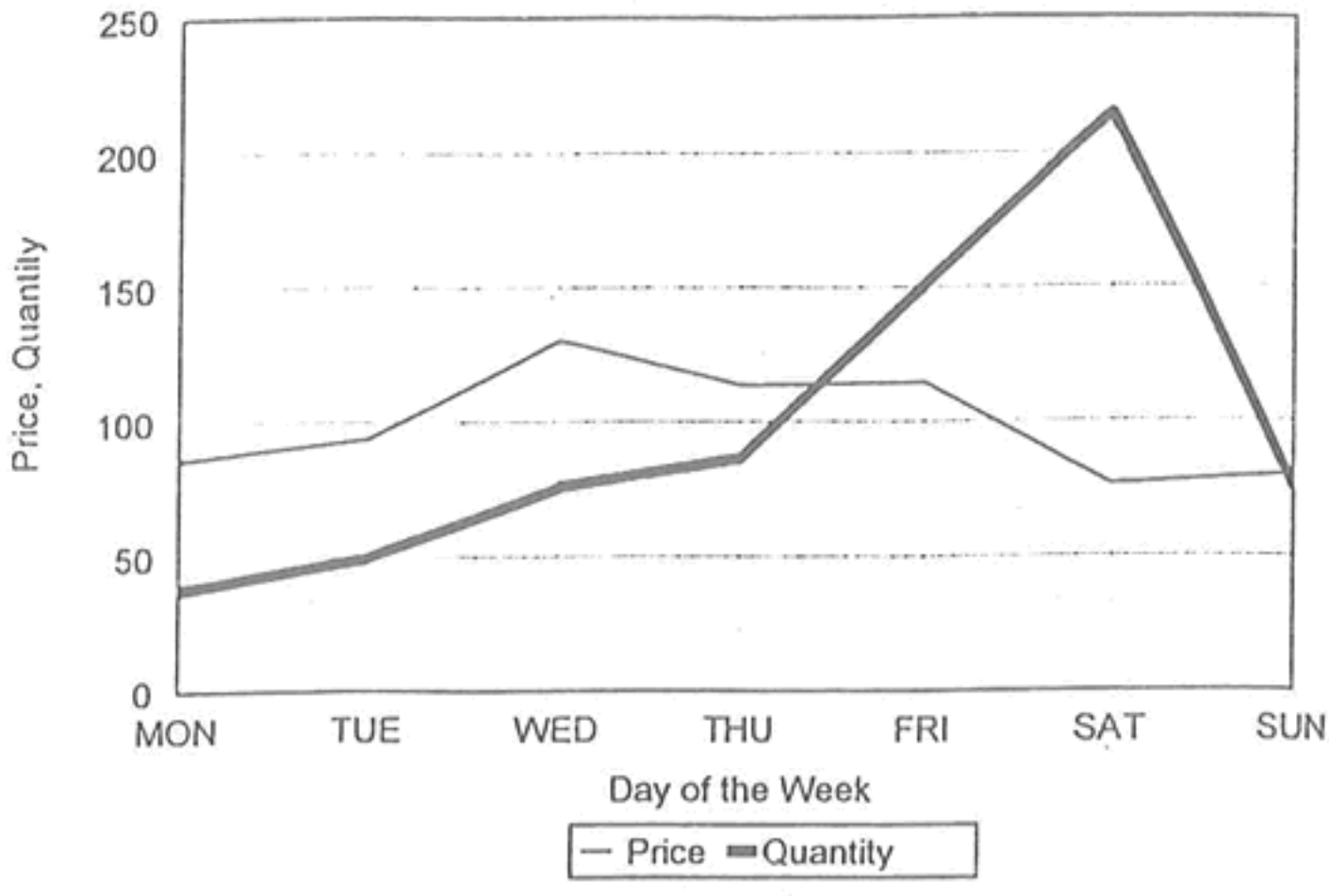

Fig. 3. Yellow Fine Tuna Simple price and Quantity relatives.

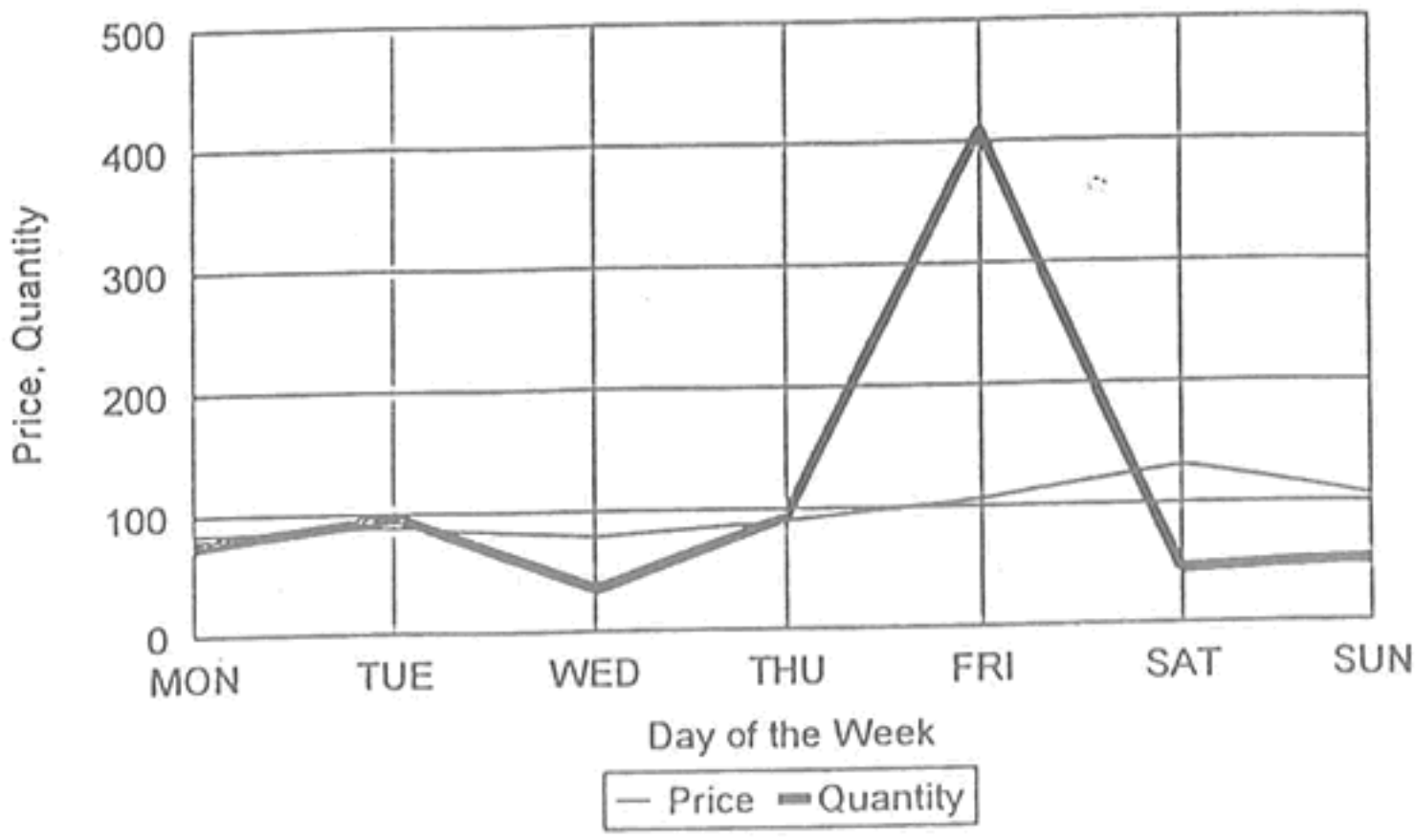

Fig. 4. Longtail Tuna Simple price and Quantity relatives

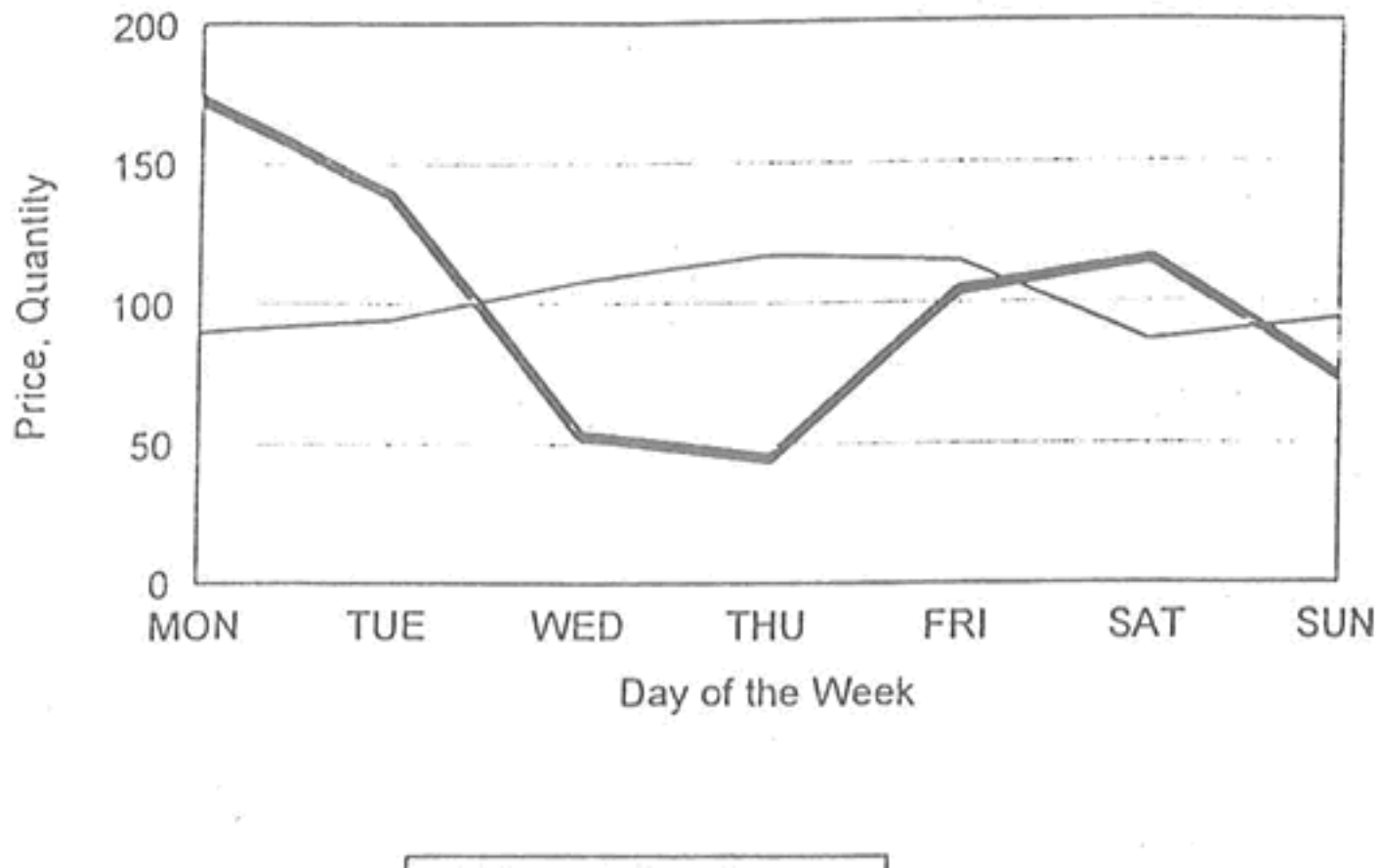

Fig. 5. Squid Simple price and Quantity reltives

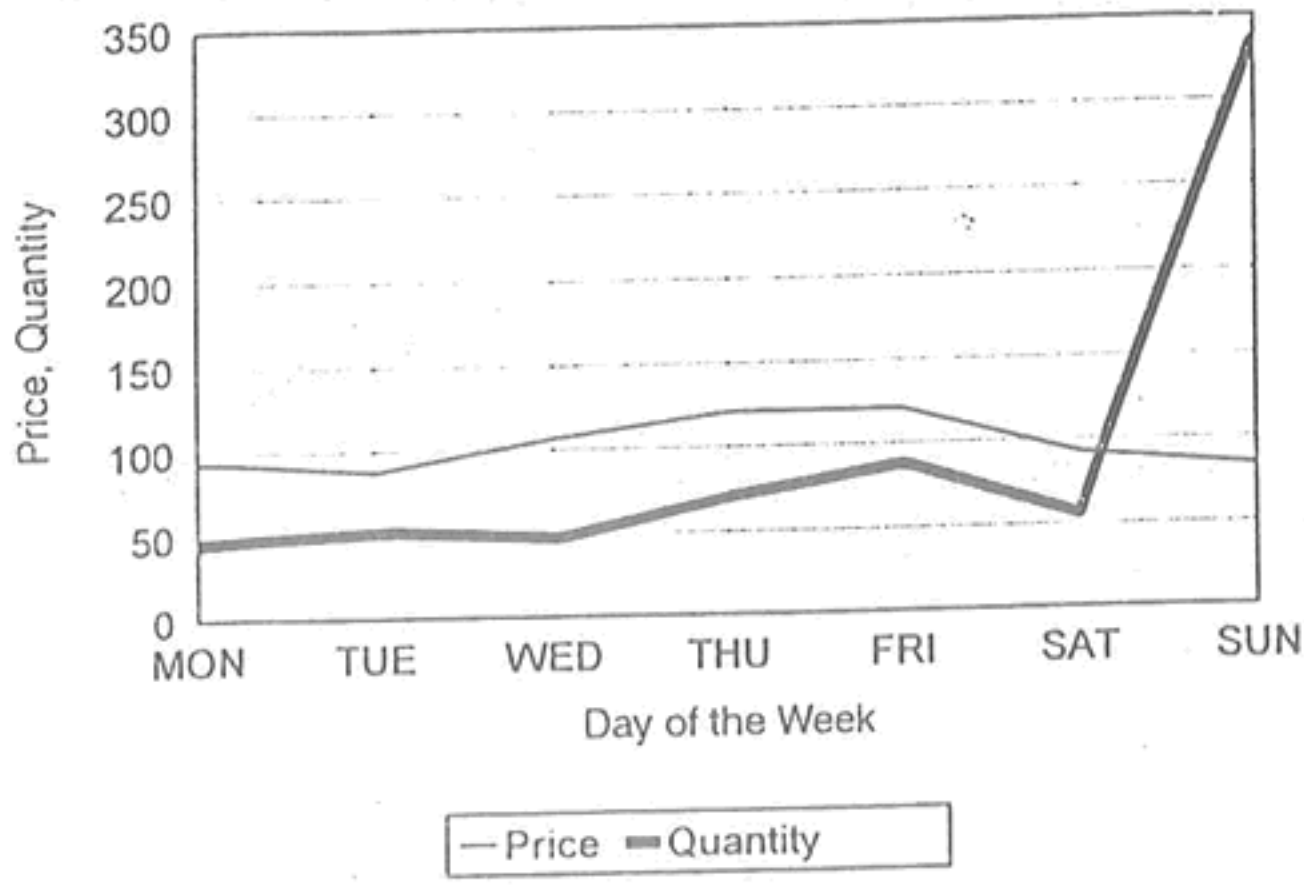

Fig. 6. Silver Grunt Simple price and Quantity relatives

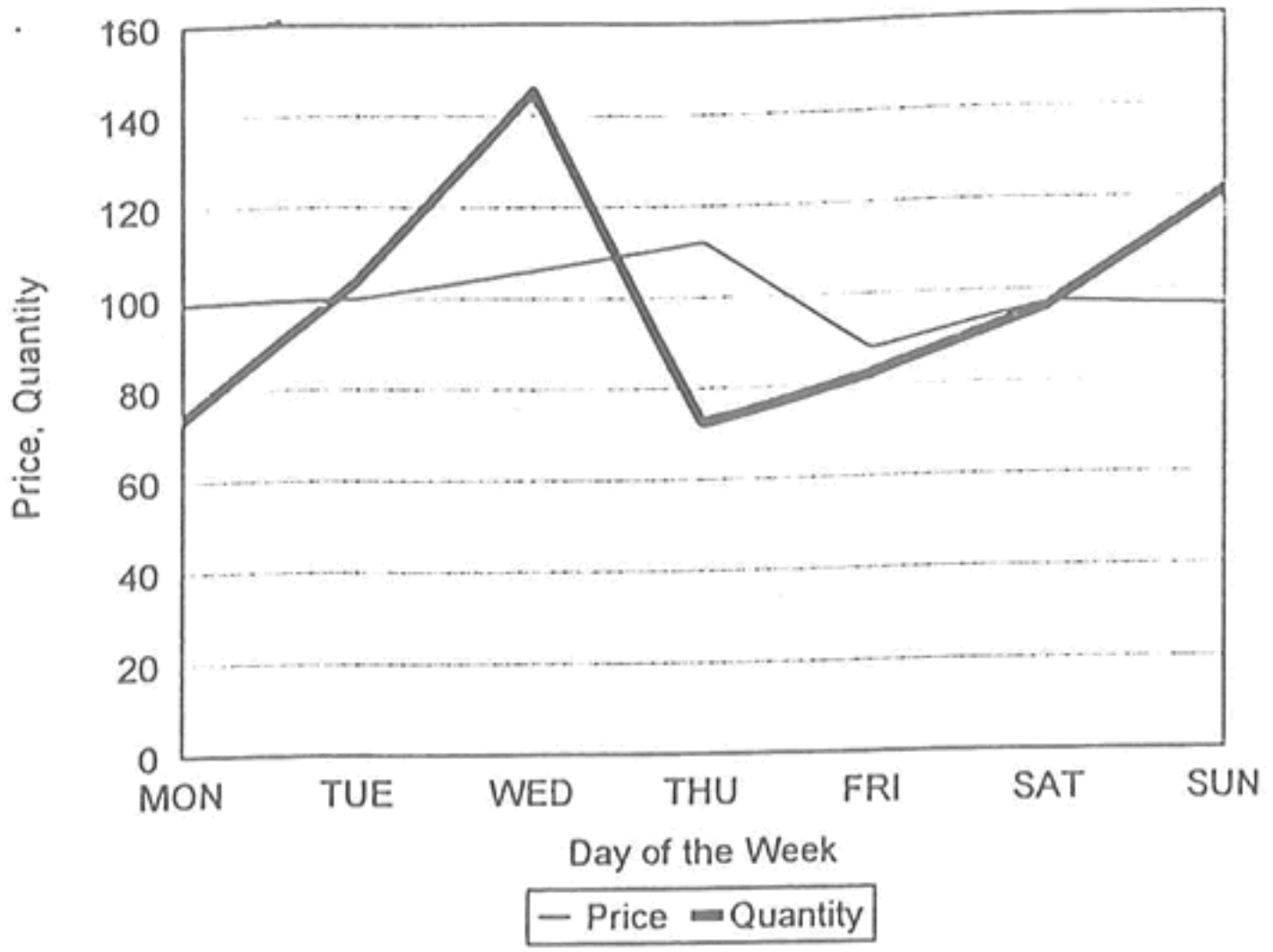

Fig. 7. Sardines Simple price and Quantity relatives

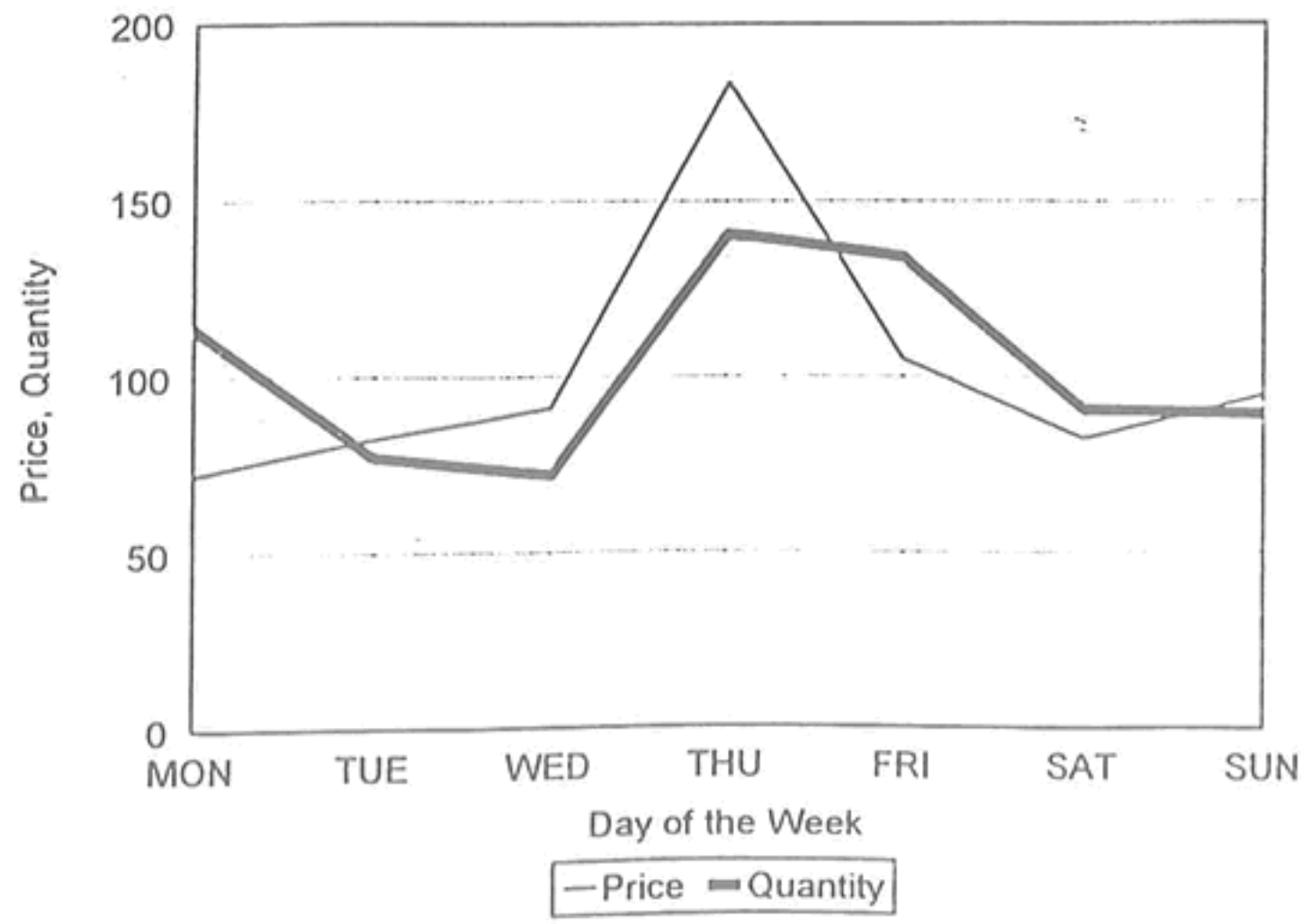

Table 1. Regresssion analysis. Model: Price/kg = $\beta_0 + \beta_1 T$ where T=1 for Thursday and Friday as weekend days and T=0 otherwise.

Species	F value	Parameter Estimates		Tests	
		Intercept	Slope	$H_0:\beta_0 = 0$	$H_0:\beta_1=0$
		β_0	β_1	$H_1:\beta_0>0$	$H_1:\beta_1>0$
Yellow Fin Tuna	4.79	0.9513 (10.74)*	0.3304 (2.19)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha<.05$ There is price differential
King Fish	4.302	1.6804 (9.858)*	0.5935 (2.074)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha<.05$ There is price differential
Long Tail Tuna	2.09	0.8301 (18.90)*	0.1151 (1.45)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha \sim 0.5$ There is price differential
Silver Grunt	0.27	0.8232 (2.69)*	0.0327 (0.52)*	H_1 is true $\alpha<.01$	H_0 is true No price differential
Squid	15.51	0.7250 (26.89)*	0.215 (3.94)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha<.03$ There is price differential
Sardines	0.050	0.6696 (19.1)*	-0.0005 (-0.008)*	H_1 is true $\alpha<.01$	H_0 is true There is no price differential

* Values in parenthesis are t values.

α : confidence level.

Table 2. Regression analysis. Model : Price/Kg = $\beta_0 + \beta_1$ T where T=1 for Thursday as a weekend day and T=0 otherwise.

Species	F value	Parameter Estimates		Tests	
		Intercept	Slope	$H_0:\beta_0 = 0$	$H_0:\beta_1=0$
		β_0	β_1	$H_1:\beta_0>0$	$H_1:\beta_1>0$
Yellow Fin Tuna	5.73	0.99198 (12.87)*	0.46661 (2.39)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha<.05$ There is price differential
King Fish	2.399	1.7840 (9.858)*	0.5528 (2.074)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha<.1$ There is price differential
Long Tail Tuna	2.69	0.8398 (21.24)*	0.1661 (1.45)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha < .1$ There is price differential
Silver Grunt	0.55	0.8249 (27.57)*	0.0643 (0.74)*	H_1 is true $\alpha<.01$	H_0 is true No price differential
Squid	5.44	0.7549 (27.24)*	0.18514 (2.33)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha<.05$ There is price differential
Sardines	0.04	0.6716 (20.8)*	-0.0188 (-0.2)*	H_1 is true $\alpha<.01$	H_0 is true There is no price differential

* Values in parenthesis are t vaues.

α : confidence interval.

Table 3. Regression analysis. Model : Price/Kg = $\beta_0 + \beta_1 T$ where T=1 for Friday as a weekend day and T=0 for Thursday, Saturday, Sunday, Monday, Tuesday and Wednesday.

Species	F value	Parameter Estimates		Tests	
		Intercept β_0	Slope β_1	$H_0:\beta_0 = 0$ $H_1:\beta_0>0$	$H_0:\beta_1=0$ $H_1:\beta_1>0$
Yellow Fin Tuna	0.027	1.0594 (12.6)*	0.0350 (0.165)*	H_1 is true $\alpha<.01$	H_0 is true There is no price differential
King Fish	0.87	1.8319 (11.604)*	0.3666 (0.93)*	H_1 is true $\alpha<.01$	H_0 is true There is no price differential
Long Tail Tuna	0.05	0.8617 (21.17)*	0.0227 (0.22)*	H_1 is true $\alpha<.01$	H_0 is true There is no price differential
Silver Grunt	0.000	0.8326 26.88)*	-.0006 (-0.008)*	H_1 is true $\alpha<.01$	H_0 is true No price differential
Squid	5.44	0.7549 (27.24)*	0.1851 (2.33)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha<.01$ There is price differential
Sardines	0.03	0.6673 (20.45)*	0.015 (0.18)*	H_1 is true $\alpha<.01$	H_0 is true There is no price differential

* Values in parenthesis are t values.

α : level of singnificance.

Table 4. Regression analysis. Model : Price/Kg = b0 + b1 T where T=1 for Thursday, Friday and Wednesday as weekend days and T=0 otherwise.

Species	F value	Parameter Estimates		Tests	
		Intercept	Slope	$H_0:\beta_0 = 0$	$H_0:\beta_1=0$
		β_0	β_1	$H_1:\beta_0>0$	$H_1:\beta_1>0$
Yellow Fin Tuna	6.02	0.9123 (9.71)*	0.3487 (2.45)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha<.05$ There is price differential
King Fish	4.17	1.6017 (8.12)*	0.5606 (2.04)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha<.06$ There is price differential
Long Tail Tuna	2.52	0.8187 (17.52)*	0.1185 (1.59)*	H_1 is true $\alpha<.01$	H_1 is true α ~.15 There is price differential
Silver Grunt	2.6	0.7923 (21.4)*	0.0888 (1.61)*	H_1 is true $\alpha<.01$	H_1 is true α ~ .10 There is price differential
Squid	17.1	0.70100 23.68)*	0.1959 (4.13)*	H_1 is true $\alpha<.01$	H_1 is true $\alpha.<.01$ There is price differential
Sardines	0.01	0.6661 (16.94)*	0.0082 (0.13)*	H_1 is true $\alpha<.01$	H_0 is true There is no price differential

*Values in parathesis one t values.
α Level of significance.

مجلة الإمارات للعلوم الزراعية (١٩٩٦) ٨ : ١٢٨ - ١٤٥

تحليل أسعار الاسماك اليومية بسوق السيب - سلطنة عمان

عبدالله أومازينق وكارل أ. أولسون

قسم الاقتصاد الزراعي والدراسات الريفية ، كلية الزراعة ، جامعة السلطان قابوس ، ص.ب ٣٤، الخوض ١٢٣، سلطنة عمان .

ملخص :

يعتبر سوق الاسماك الواقع في منطقة السيب بسلطنة عمان من أكبرالاسواق العمانية لتجميع وبيع الأسماك . مشتري الأسماك بهذه المنطقة يظنون بأن أسعار الأسماك مرتفعة خاصة أيام الخميس والجمعة (باعتبارهما ايام العطلة) مقارنة بباقي ايام الاسبوع. من هذا المنطلق اجريت هذه الدراسة لاختبار هذا الافتراض على ستة اصناف من الاسماك المشتهر تداولها في هذه المنطقة .

ولكي يتم استنباط النتيجة استخدمت عدة طرق لاجراء عمليات التحليل والبحث نذكر منها : التحليل بواسطة استخدام الرسم الجرافي معتمدين استعمل المعدل البسيط والنسبي لكل من اسعار الاسماك وكمياتها والغرض من هذه الطريقة هو محاولة استنتاج ما اذا كان هناك بعض التغيرات قصيرة المدى للأسعار واستخدام أمثلة تحاليل إحصائية تعتمد على نموذج الانتقال أو الارتداد الخطي للتحقق من تباين اسعار الاسماك بين ايام اخر الاسبوع والايام الاخرى الغرض من هذه الطريقة هو تحليل المعلومات المتيسرة لاستنتاج بعض التغيرات او الاختلافات في الاسعار والكميات مابين ايام الخميس والجمعة وباقي ايام الاسبوع .

تشير نتائج هذا البحث بوجود ارتفاع اسعار الاسماك خلال ايام الخميس والجمعة لكل من الأصناف التالية : كنعد ، جيذر، سهوه ، هيمه ، لكن لم يثبت اي تغير واضح في أسعار كل من العومه والنجرور. كما اشارت النتائج إلىأن معظم إرتفاع الاسعار يحصل أيام الخميس .

كلمات مفتاحية : أسمدة ، علف ، غلة ، بقول ، وزن جاف ، نمو ، انتاجية .