Proc. Fla. State Hort. Soc. 94:186-189. 1981.

PROJECTING REGIONAL MARKET SHARES FOR SELECTED FLORIDA FRESH MARKET VEGETABLES[1]

WAYNE H. HOWARD AND W. ARDEN COLETTE
University of Florida, IFAS,
Food and Resource Economics Department,
1175 McCarty Hall,
Gainesville, Florida 32611

Abstract. **Growers of tomatoes, cucumbers, eggplants and green peppers in Florida have exhibited concern about their market share in the U.S. winter fresh vegetable market. Several studies have looked at the affects of changes in tariffs and Market Orders on Florida's market share from 1962-1979 using regression and time-series analysis. Florida produce dominates the market in the eastern regions during the winter and spring season. Even though the market shares fluctuate, Florida has maintained this dominance over the period studied. One time "shocks" are observed in the western regions, where Florida has historically had a smaller share. The market shares have stabilized after the shocks. Forecast market shares, based on the time-series models, show Florida's producers maintaining their dominance in the eastern markets and also maintaining a stable, though much smaller share, in the western regions.**

For many years Florida has been one of the major suppliers of winter fresh vegetables in the United States. California leads Florida in overall vegetable production, but because of Florida's climatic advantage, it has dominated the United States fresh vegetable market in the winter and spring seasons.

Although the dominance has been primarily in the eastern markets, Florida produce has been shipped as far west as San Francisco and Los Angeles. Those markets where Florida had a 50 percent or greater market share have shown Florida dominating the market from November or December (depending on the vegetable in question) through May or June.

In the early 1960s Florida enjoyed a relatively constant market share in the winter and spring seasons. Florida's share of the fresh vegetable market today fluctuates throughout the season. The seasonal and spatial market boundaries found for Florida's produce twenty years ago are much different today. This paper looks at changes in Florida's share of the fresh tomato, cucumber, eggplant, and green papper market, and forecasts what the market share for those vegetables may be expected to be in the future.

The per capita consumption of vegetables has increased over the past decade, but primarily in frozen vegetables. A few fresh vegetables, such as cucumbers and peppers, have had an increase in per capita consumption. The consumption of tomatoes and eggplant has fluctuated but has not shown a definite trend (5).

A number of studies in recent years have looked at Florida's comparative advantage with foreign producers, primarily Mexico, and forecast trends in the relative supply and cost of factors of production. Mexico appears to have an advantage in production costs, and Florida, because of lower transportation costs, an advantage of marketing costs. Simmons, *et al.* (7) indicate that these cost advantages are approximately equal in a region stretching between New Orleans and Detroit. Mexico is expected to increase its advantage in production costs. (4, 9)

Other studies have looked at the effectiveness of tariffs on imported fresh vegetables, and concluded that without the present tariffs, Florida's winter fresh vegetables would not be competitive in the U.S. (1, 3) The effect of marketing orders on Florida's market share of these vegetables has generally been thought of as beneficial to consumers and Florida producers. (2, 8)

Materials and Methods

Time series analysis, generally referred to as an ARIMA process (for Auto-Regressive Integrated Moving Average) is used to analyze what has occurred in the past and to forecast into the future. This procedure forecasts based on historical patterns rather than on any casual relationships. (6)

The data used is from the U.S.D.A. "Fresh Fruit and Vegetable Unloads," from 1962 through 1979. The market shares are looked at regionally, over seven U.S. regions as outlined by the A.C. Nielson marketing service: South-East, Mid-Atlantic, New England, East Central, West Central, South-West and Pacific.

Results and Discussion

The seasonal and spatial marketing patterns that Florida had for the vegetables in question have changed over the past twenty years. The change does not appear to be a gradual change, though. Instead, it appears that a "shock" occurred to the system, and that Florida's marketing pattern quickly adjusted to the shock, and then settled down into the "new" pattern, with, of course, normal fluctuations as have always occurred. The quantity of Florida's fresh tomatoes unloaded across the U.S. has tended to increase approximately 90,000 cwt. per year. The quantity unloaded across the U.S. of the other vegetables have remained steady.

Figures 1 through 8 show the marketing pattern of Florida's fresh vegetables in the southeast region. The shift observed in the southeast region are typical of the marketing occurring throughout the U.S. The monthly market shares for 1962 and 1980 by region are shown in Tables 1 through 4.

Table 1. Florida share of the fresh tomato market, 1962 and 1980, estimated.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
South East												
1962	.93	.88	.92	.94	.93	.20	.00	.00	.00	.00	.00	.91
1980	.81	.37	.17	.21	.81	.40	.14	.03	.00	.05	.54	.87
Mid Atlantic												
1962	.83	.80	.89	.81	.78	.20	.00	.00	.00	.00	.00	.87
1980	.80	.34	.09	.29	.85	.50	.03	.02	.02	.06	.65	.86
New England												
1962	.93	.67	.95	.86	.76	.11	.00	.00	.00	.00	.00	.90
1980	.76	.42	.12	.40	.92	.42	.07	.02	.02	.06	.85	.95
East Central												
1962	.68	.78	.86	.62	.38	.11	.00	.00	.00	.00	.00	.50
1980	.55	.14	.03	.08	.54	.30	.06	.01	.01	.02	.23	.69
West Central												
1962	.63	.56	.67	.60	.48	.14	.01	.00	.00	.00	.00	.54
1980	.50	.30	.29	.47	.24	.00	.00	.00	.00	.00	.12	.60
South West												
1962	.28	.18	.25	.21	.20	.01	.00	.00	.00	.00	.00	.26
1980	.33	.10	.09	.11	.39	.15	.02	.01	.01	.01	.14	.51
Pacific												
1962	.11	.06	.03	.02	.07	.01	.00	.00	.00	.00	.00	.06
1980	.10	.04	.03	.04	.15	.06	.01	.01	.01	.01	.03	.18

[1]Florida Agricultural Experiment Stations Journal Series No. 3526.

Table 2. Florida's share of the fresh green pepper market, 1962 and 1980, estimated.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
South East												
1962	.94	1.0	1.0	1.0	.98	.57	.11	.01	.02	.00	.00	.39
1980	.94	.24	.10	.87	.96	.67	.16	.00	.00	.11	.60	1.0
Mid Atlantic												
1962	.94	.99	1.0	.99	.97	.60	.03	.00	.00	.00	.12	.33
1980	1.0	.55	.28	.98	1.0	.87	.20	.15	.15	.19	.56	1.0
New England												
1962	1.0	1.0	1.0	1.0	1.0	.62	.02	.00	.00	.00	.07	.19
1980	.79	.46	.47	.91	.90	.53	.00	.00	.00	.00	.34	.74
East Central												
1962	.97	.98	1.0	.95	.83	.22	.04	.00	.00	.00	.10	.34
1980	.61	.30	.31	.83	.89	.44	.06	.00	.00	.02	.37	.73
West Central												
1962	.75	.79	.85	.89	.69	.11	.01	.00	.00	.00	.03	.28
1980	.50	.01	.00	.58	.76	.34	.03	.00	.00	.00	.30	.57
South West												
1962	.60	.96	.97	.86	.37	.00	.00	.00	.00	.00	.01	.05
1980	.26	.12	.14	.43	.40	.05	.00	.00	.00	.00	.03	.29
Pacific												
1962	.18	.14	.21	.18	.22	.02	.00	.00	.00	.00	.01	.02
1980	.02	.00	.00	.04	.15	.03	.00	.00	.00	.00	.00	.04

Table 3. Florida's share of the fresh cucumber market, 1962 and 1980, estimated.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
South East												
1962	1.0	1.0	1.0	1.0	.89	.22	.05	.04	.06	.31	.92	.95
1980	.44	.00	.00	.86	.83	.27	.07	.00	.06	.40	.85	.84
Mid Atlantic												
1962	.70	.36	.81	1.0	.94	.15	.00	.00	.00	.28	.97	.98
1980	.16	.00	.00	.84	.85	.35	.01	.00	.00	.38	.87	.54
New England												
1962	.33	.22	.81	.84	.87	.14	.00	.00	.00	.24	.98	.91
1980	.00	.00	.00	.76	.84	.34	.16	.00	.10	.98	.98	.51
East Central												
1962	.52	.37	.63	.57	.59	.14	.00	.00	.00	.25	.90	.88
1980	.07	.00	.00	.61	.61	.65	.11	.10	.16	.74	.85	.55
West Central												
1962	.87	.53	.74	.83	.61	.07	.01	.00	.00	.29	.85	.89
1980	.06	.00	.00	.61	.65	.28	.00	.00	.00	.32	.57	.38
South West												
1962	.93	.84	.86	.91	.11	.03	.00	.00	.00	.07	.20	.56
1980	.00	.-0	.00	.34	.15	.02	.00	.00	.00	.08	.10	.11
Pacific												
1962	.18	.14	.15	.06	.01	.00	.00	.00	.00	.01	.13	.22
1980	.00	.00	.00	.08	.05	.00	.00	.00	.00	.00	.00	.00

Table 4. Florida's share of the fresh eggplant market, 1962 and 1980, estimated.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
South East												
1962	1.0	1.0	1.0	1.0	1.0	.80	.30	.08	.00	.31	.89	1.0
1980	.85	.67	.64	.82	.94	.78	.26	.07	.01	.39	.85	.92
Mid Atlantic												
1962	1.0	1.0	.99	1.0	1.0	.99	.36	.00	.00	.15	.92	1.0
1980	.52	.26	.24	.63	.91	.89	.44	.08	.09	.50	.91	.72
New England												
1962	1.0	1.0	1.0	1.0	1.0	.87	.11	.00	.00	.13	1.0	1.0
1980	.32	.14	.20	.61	.88	.84	.10	.00	.00	.33	.78	.49
East Central												
1962	1.0	1.0	1.0	1.0	1.0	1.0	.20	.00	.00	.15	1.0	1.0
1980	.36	.18	.13	.59	.86	.74	.01	.00	.00	.40	.77	.63
West Central												
1962	1.0	.92	.94	1.0	.94	.71	.37	.00	.00	.11	.79	.80
1980	.33	.05	.01	.32	.61	.66	.07	.00	.00	.38	.70	.55
South West												
1962	1.0	.93	1.0	1.0	1.0	.27	.00	.00	.00	.11	.38	.55
1980	.11	.04	.00	.19	.28	.28	.00	.00	.00	.10	.42	.37
Pacific												
1962	.32	.17	.14	.06	.05	.00	.00	.00	.00	.00	.02	.07
1980	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

Table 5. U.S. unloads of Florida tomatoes, cucumbers, peppers, and eggplants. 1962-79.

Years	Tomatoes	Cucumbers	Peppers	Eggplant
		Number		
1962[z]	2296[y]	1072[y]	880[y]	247[y]
1963	2579	1291	1056	258
1964	2609	1409	1129	261
1965	2689	1293	1017	271
1966	3975	1418	1166	261
1967	4419	1540	1275	295
1968	3671	1239	1362	203
1969	3272	1239	1182	210
1970[z]	2852	1202	734	207
1971[z]	3663	1087	884	194
1972	4105	1199	1058	248
1973	3718	1097	1149	216
1974	3650	1251	1278	266
1975	4391	1363	1538	347
1976	4563	1537	1490	323
1977[z]	3324	1331	1315	273
1978	4012	1435	1034	271
1979	4519	1223	1008	288

[z]Year of a hard freeze.
[y]All quantities are in 1000/cwts.

Tomatoes

Figure 1 shows the pattern that Florida's market share for fresh tomatoes exhibited in the early 1960s. From December through May, Florida had a 50 percent or greater market share in all regions except for the southwest and Pacific regions. These two regions combined did not usually account for more than ten percent of Florida's marketed tomatoes. Figure 2 shows a much different pattern. Florida has a 50 percent or greater market share in January, December and May in the four eastern regions, but in no region does Florida have a 50 percent or greater share in February through April. The quantities of Florida fresh tomatoes unloaded across the U.S. has increased on the average in all months except February, March and April.

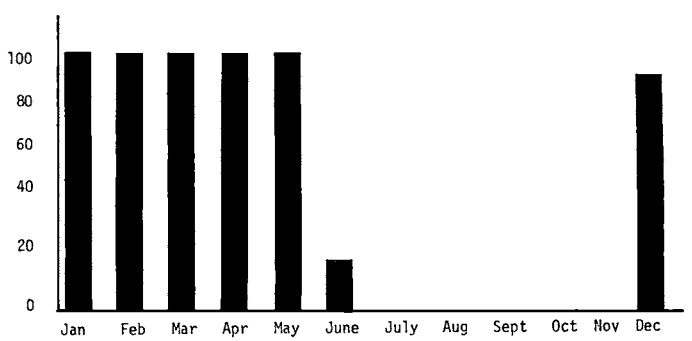

Fig. 1. Florida's market share for fresh tomatoes, 1962.

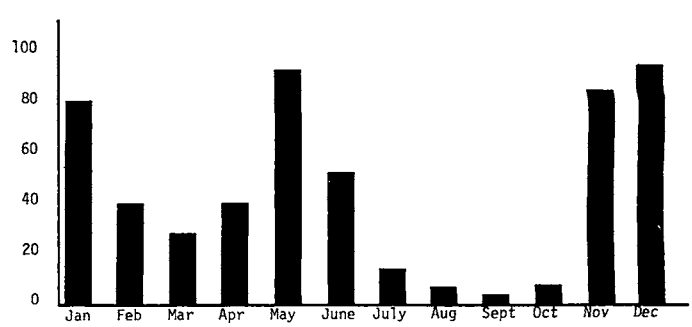

Fig. 2. Florida's market share of fresh tomatoes, 1980.

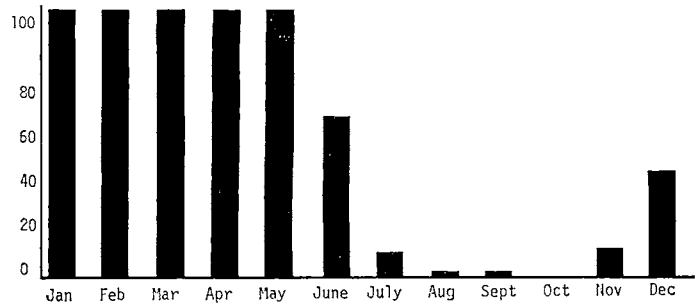

Fig. 3. Florida's market share of peppers, 1962.

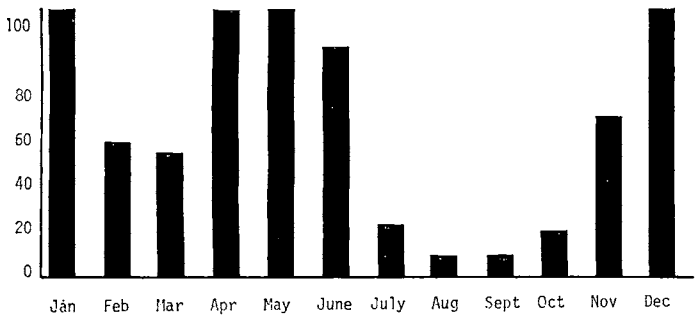

Fig. 4. Florida's forecast market share of peppers, 1980.

The change in the marketing pattern occurred in different years in different regions, but the initial shock started in 1970, and was complete within two years. The ARIMA models forecast that Florida's share of the fresh tomato market shown in Figure 2 will continue through 1984. The forecast values, by month and region, are in Table 1.

Peppers

Florida's market share for fresh green peppers was strong in the winter and spring seasons in the early 1960s (Fig. 3). Florida had a market share of at least 50 percent from January through May in all regions but the Pacific region. The pattern started to change in the early 1970s, quickly resulting in the pattern shown in Figure 4. Florida increased its market share in November and December to 50 percent or greater in all regions except the southwest and Pacific regions. But Florida's market share decreased to less than 50 percent in February and March in all regions. The yearly total of Florida fresh peppers unloaded across the U.S. has not changed. Florida's peppers are entering the market earlier in the fall/winter, and competing in the market later into the spring. The ARIMA model for green peppers forecast a continuation of the pattern in Figure 5 through 1984. The values of the forecasts, by month and region, are in Table 2.

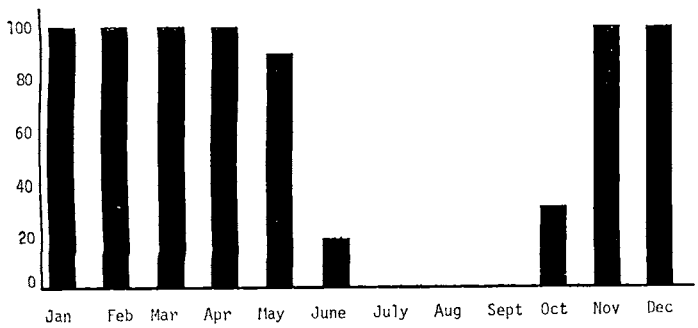

Fig. 5. Florida's market share of cucumbers. 1962.

Cucumbers

In the early 1960s Florida had a 50 percent or greater share of the fresh cucumber market in all but the two western regions from November through May. Figure 5 shows this pattern that was more or less stable until the early 1970s, when a shock occurred, resulting in the market share pattern in Figure 6. Once again, Florida's produce is

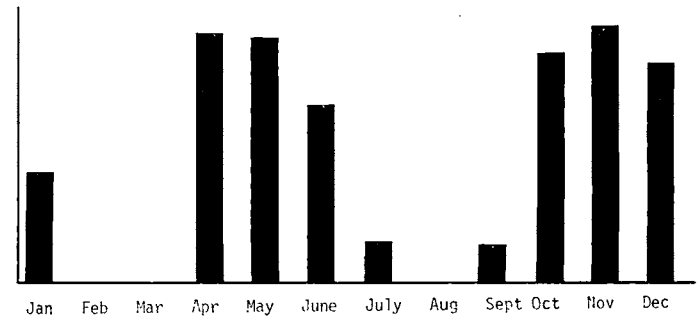

Fig. 6. Florida's forecast market share of cucumbers, 1980.

now entering the market earlier in the season and stays longer, but has less than a 50 percent market share in all regions in January through March. The yearly quantity unloaded across the U.S. has not changed. The ARIMA models used to estimate Florida's market share for cucumbers forecast a continuation of the pattern shown in Figure 5. The market shares for the regions are in Table 3.

Eggplant

Florida dominated the U.S. fresh eggplant market in the early 1960s with close to 100 percent of the winter and spring season market in all regions except the Pacific region (Fig. 7). As with the other vegetables, a shock occurred in

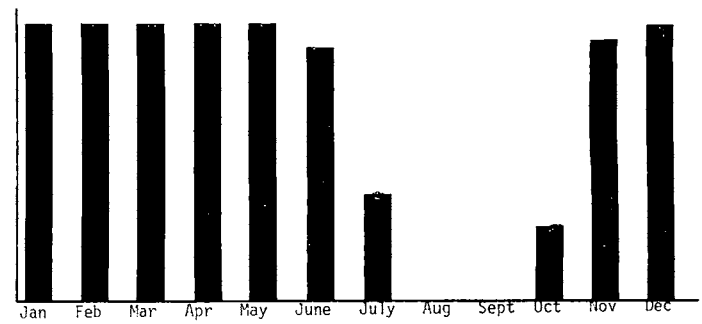

Fig. 7. Florida's market share of eggplant, 1962.

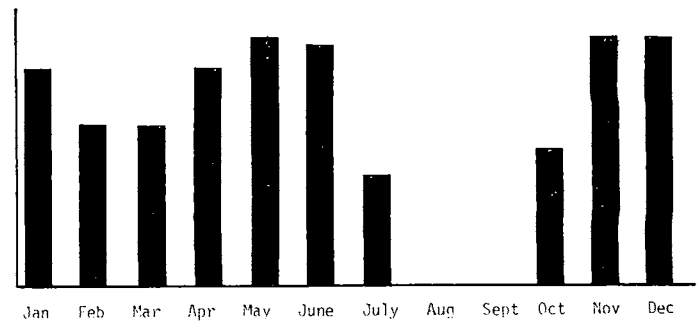

Fig. 8. Florida's forecast market share of eggplant, 1980.

the late 1960s and early 1970s that altered the pattern of Florida's market share. The result of the shock was Florida with a 50 percent or greater market share in the four eastern regions only, and in January and April through June. The yearly quantity of Florida fresh eggplants unloaded across the U.S. did not change in this time period. Figure 8 shows

the pattern forecast by the ARIMA models. This pattern is forecast to continue through 1984. The forecast market share values by region are listed in Table 4.

There have been definite changes in the spatial and seasonal marketing patterns of Florida fresh tomatoes, cucumbers, green peppers and eggplant. In the early 1960s Florida clearly dominated all the eastern and midwestern markets, throughout the winter and spring seasons. The shock to the system that disrupted that marketing pattern changed the pattern permanently. Florida's produce dominates the eastern U.S. in the fall and spring, but no longer through the winter as it did in the early 1960s. This is not to say that Florida is marketing less vegetables now. Table 5 shows that, as far as quantities unloaded are concerned, unloads of Florida tomatoes have increased while the other vegetables have remained relatively steady. Referring again to Figures 1 through 8, one can see that except for eggplant, Florida has dominance in some of the winter months but has increased it's share of the early fall market and the late spring market. It could be that Florida's tomatoes, cucumbers and green pepper producers adjusted to the "shock" by aiming for different "market windows". Based on the ARIMA models which forecast on the basis of past occurrences, one can say that the spatial and temporal market shares have changed, but the quantities have remained the same or increased. There will continue to be normal fluctuations in both market shares and quantities unloaded, but unless there is another major shock to the system, the patterns one sees today can be expected to remain stable.

Literature Cited

1. Andrew, C. O., T. DeBoon and W. W. McPherson. Effects of Trade Policies On Competition Between Florida and Mexico In The U.S. Winter Cucumber Market. July, 1975. Southern Journal of Agricultural Economics. 7(1):197-204.
2. Brooker, John R. and James L. Pearson. Economic Impact of Federal Marketing Orders—The Florida Winter Tomato Case. December, 1975. Southern Journal of Agricultural Economics. 7(2):177-186.
3. Dickinson, T. E. The Impact of the U.S.'s Changing Its Tariff On Mexicon Winter Tomatoes. 1972. Western Farm Economics Association Proceedings. 45:172-176.
4. Flinginger, John C., Earle E. Gavett, Robert P. Jenkins and Levi A. Powell. 1969. Supplying U.S. Markets with Fresh Winter Produce: Capabilities of U.S. and Mexican Producing Areas. Agricultural Economic Report No. 154. U.S.D.A.-E.R.S.
5. Johnson, Allen O. 1977. Food Consumption, Prices and Expenditures. Agricultural Economic Report No. 138, Supplement U.S.D.A.-E.S.C.S.
6. Nelson, Charles R. Applied Times Series Analysis For Managerial Forecasting. 1973. Holden-Day, San Francisco, California.
7. Simmons, Richard L., James L. Pearson and Ernest B. Smith. 1976. Mexican Competition for the U.S. Fresh Winter Vegetable Market. Agricultural Economic Report 348. U.S.D.A.-E.R.S.
8. Wall, G. Bryan. Florida Winter Cucumbers—Is a Federal Market Program Needed? March, 1977. Economic Information Report 68. Food and Resource Economics Department, University of Florida.
9. Zepp, G. A. and Richard L. Simmons. November, 1979. Producing Fresh Winter Vegetables in Florida and Mexico: Costs and Competition. E.S.C.S. Report No. 72. U.S.D.A.-E.S.C.S.