PROJECTING REGIONAL MARKET SHARES FOR SELECTED FLORIDA FRESH MARKET VEGETABLES

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 effects 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 through­
out 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
pepper 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 con­
sumption 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 ad­
antage 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, 9) 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”
ocurred 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 to­
matoes unloaded across the U.S. has tended to increase ap­
proximately 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 market­
ning 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.

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East</td>
<td>93</td>
<td>88</td>
<td>92</td>
<td>94</td>
<td>95</td>
<td>90</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>1962</td>
<td>81</td>
<td>37</td>
<td>17</td>
<td>21</td>
<td>81</td>
<td>40</td>
<td>14</td>
<td>03</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>South Mid Atlantic</td>
<td>85</td>
<td>80</td>
<td>89</td>
<td>81</td>
<td>78</td>
<td>70</td>
<td>20</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>1962</td>
<td>80</td>
<td>34</td>
<td>09</td>
<td>25</td>
<td>35</td>
<td>50</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>South New England</td>
<td>95</td>
<td>87</td>
<td>95</td>
<td>86</td>
<td>76</td>
<td>11</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>1962</td>
<td>76</td>
<td>42</td>
<td>12</td>
<td>40</td>
<td>92</td>
<td>42</td>
<td>07</td>
<td>02</td>
<td>02</td>
<td>06</td>
<td>85</td>
</tr>
<tr>
<td>South East Central</td>
<td>68</td>
<td>78</td>
<td>86</td>
<td>82</td>
<td>38</td>
<td>11</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>1962</td>
<td>55</td>
<td>14</td>
<td>03</td>
<td>08</td>
<td>54</td>
<td>20</td>
<td>00</td>
<td>01</td>
<td>02</td>
<td>23</td>
<td>69</td>
</tr>
<tr>
<td>South West Central</td>
<td>63</td>
<td>56</td>
<td>67</td>
<td>60</td>
<td>48</td>
<td>14</td>
<td>01</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>1962</td>
<td>50</td>
<td>30</td>
<td>29</td>
<td>47</td>
<td>24</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>12</td>
</tr>
<tr>
<td>South South West</td>
<td>28</td>
<td>18</td>
<td>25</td>
<td>21</td>
<td>20</td>
<td>01</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>1962</td>
<td>35</td>
<td>10</td>
<td>09</td>
<td>11</td>
<td>39</td>
<td>15</td>
<td>02</td>
<td>01</td>
<td>01</td>
<td>14</td>
<td>51</td>
</tr>
<tr>
<td>Pacific</td>
<td>11</td>
<td>06</td>
<td>03</td>
<td>02</td>
<td>07</td>
<td>01</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>06</td>
</tr>
<tr>
<td>1962</td>
<td>10</td>
<td>04</td>
<td>03</td>
<td>04</td>
<td>15</td>
<td>06</td>
<td>01</td>
<td>01</td>
<td>01</td>
<td>01</td>
<td>18</td>
</tr>
</tbody>
</table>
Table 2. Florida's share of the fresh green pepper market, 1962 and 1980, estimated.

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>0.98</td>
<td>0.57</td>
<td>0.11</td>
<td>0.01</td>
<td>0.02</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1980</td>
<td>0.84</td>
<td>0.24</td>
<td>0.10</td>
<td>0.87</td>
<td>0.96</td>
<td>0.67</td>
<td>0.16</td>
<td>0.00</td>
<td>0.00</td>
<td>0.11</td>
<td>0.60</td>
<td>1.00</td>
</tr>
<tr>
<td>Mid Atlantic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1962</td>
<td>0.94</td>
<td>0.99</td>
<td>1.00</td>
<td>0.99</td>
<td>0.97</td>
<td>0.60</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.12</td>
</tr>
<tr>
<td>1980</td>
<td>1.00</td>
<td>1.00</td>
<td>0.98</td>
<td>1.00</td>
<td>0.87</td>
<td>0.20</td>
<td>0.15</td>
<td>0.15</td>
<td>0.19</td>
<td>0.56</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Region</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>0.82</td>
<td>0.22</td>
<td>0.05</td>
<td>0.04</td>
<td>0.06</td>
<td>0.31</td>
<td>0.89</td>
<td>1.00</td>
</tr>
<tr>
<td>1980</td>
<td>0.70</td>
<td>0.36</td>
<td>0.81</td>
<td>1.00</td>
<td>0.94</td>
<td>0.15</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Region</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>South East</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>0.80</td>
<td>0.30</td>
<td>0.08</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1980</td>
<td>0.95</td>
<td>0.67</td>
<td>0.84</td>
<td>0.92</td>
<td>0.94</td>
<td>0.78</td>
<td>0.26</td>
<td>0.07</td>
<td>0.01</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Tomatoes</th>
<th>Cucumbers</th>
<th>Peppers</th>
<th>Eggplant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>2296</td>
<td>1072</td>
<td>880</td>
<td>247</td>
</tr>
<tr>
<td>1963</td>
<td>2579</td>
<td>1291</td>
<td>1129</td>
<td>261</td>
</tr>
<tr>
<td>1964</td>
<td>2689</td>
<td>1298</td>
<td>1017</td>
<td>271</td>
</tr>
<tr>
<td>1966</td>
<td>3975</td>
<td>1418</td>
<td>1165</td>
<td>261</td>
</tr>
<tr>
<td>1967</td>
<td>4419</td>
<td>1540</td>
<td>1275</td>
<td>295</td>
</tr>
<tr>
<td>1968</td>
<td>3671</td>
<td>1239</td>
<td>1362</td>
<td>203</td>
</tr>
<tr>
<td>1969</td>
<td>3272</td>
<td>1239</td>
<td>1182</td>
<td>210</td>
</tr>
<tr>
<td>1970</td>
<td>2853</td>
<td>1202</td>
<td>734</td>
<td>207</td>
</tr>
<tr>
<td>1971</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1972</td>
<td>4105</td>
<td>1199</td>
<td>1058</td>
<td>248</td>
</tr>
<tr>
<td>1973</td>
<td>3718</td>
<td>1097</td>
<td>1149</td>
<td>216</td>
</tr>
<tr>
<td>1974</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1975</td>
<td>4351</td>
<td>1363</td>
<td>1538</td>
<td>247</td>
</tr>
<tr>
<td>1976</td>
<td>4568</td>
<td>1537</td>
<td>1490</td>
<td>323</td>
</tr>
<tr>
<td>1977</td>
<td>3324</td>
<td>1331</td>
<td>1315</td>
<td>273</td>
</tr>
<tr>
<td>1978</td>
<td>4012</td>
<td>1435</td>
<td>1084</td>
<td>271</td>
</tr>
<tr>
<td>1979</td>
<td>4519</td>
<td>1228</td>
<td>1008</td>
<td>288</td>
</tr>
</tbody>
</table>

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.
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 southwestern 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.

**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 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 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 its 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