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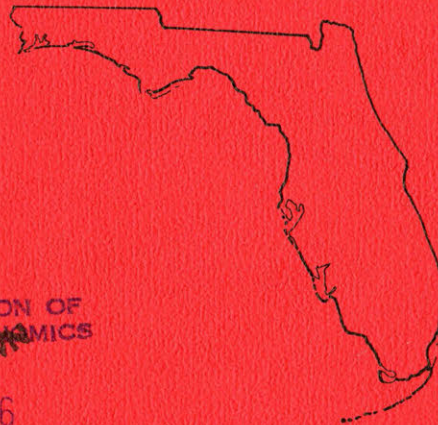
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Richard L. Kilmer

Economic Information  
Report 167r

# Growers' Returns and Marketing Costs for Florida Citrus



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## **ABSTRACT**

Changes in costs associated with each level in the fresh and processed citrus marketing channel are examined. The results indicate that more than 60 percent of the retail food dollar spent on fresh grapefruit is associated with activities that occur after the fruit leaves fresh fruit packinghouses. For frozen concentrated orange juice and canned single-strength grapefruit juice the F.O.B.-retail margin was estimated to be 25 and 27 percent, respectively, of the consumers' expenditures. Total citrus bearing acreage has declined 17 percent since 1970-71. Total citrus production has decreased 40 percent since 1979-80.

Key words: citrus marketing, marketing margins, cost trends, citrus acreage, citrus production, on-tree revenue, on-tree returns.

## **ACKNOWLEDGMENTS**

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**GROWERS' RETURNS AND MARKETING COSTS  
FOR FLORIDA CITRUS**

Richard L. Kilmer

**SUMMARY**

Total citrus bearing acreage has decreased 17 percent (144,700 acres) since 1970-71. Orange, grapefruit and speciality fruit bearing acreage represents 76, 17, and 7 percent of total citrus bearing acreage. Production peaked in 1979-80 at 282 million boxes of citrus and decreased 40 percent by 1983-84. On-tree value peaked in 1979-80 at \$1.03 million and declined 28 percent by 1983-84. Growers have generally received a lower percentage of the consumer's dollar spent on fresh fruit (18 percent) than on processed products (35 percent) even though returns for fresh fruit have generally been higher than returns from processed products. Costs of picking, hauling, packing, and processing citrus products have generally trended upward.

Fresh citrus shipments have generally trended downward since a high of 37.9 million boxes in 1975-76 to 26.3 million boxes in 1983-84 for a 30.6 percent decline. The packout percentage has generally trended upward during the 1970's and 1980's to approximately 72 per-

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cent. Packinghouse numbers have declined from a high of 276 in 1952-53 to 157 in 1983-84 for a 43.1 percent decrease. The average volume packed per packinghouse has also declined from a high of 242,771 boxes in 1978-79 to 167,723 boxes in 1983-84 for a decline of 30.9 percent.

More Florida oranges and grapefruit are processed (94 and 53 percent) than are sold in fresh form. The dominant processed orange and grapefruit product forms are frozen concentrated orange juice (86 percent) and frozen concentrated grapefruit juice (80 percent). Frozen concentrated orange juice on-tree returns claimed the highest percent of the retail dollar (34.5 percent) while fresh grapefruit and canned single strength grapefruit juice claimed an average of 18.4 and 18.6 percent. On the other hand, more than 60 percent of the retail value of fresh grapefruit is added at the wholesale-retail level while 25 and 27 percent of the retail value is added at the wholesale-retail level for frozen concentrated orange juice and canned single strength grapefruit juice.

## INTRODUCTION

The United States Department of Agriculture has published the farmer's share of the consumer's food dollar on many commodities for many years. The 19 percent increase in retail food prices from 1980 through 1985 (USDA, p. 37) has stimulated an interest in the cost of the marketing function performed between the producer and consumer. The purpose of this update of a previous report (Kilmer, 1982) is to

examine at the costs associated with each level in the fresh and processed citrus marketing channel. This report includes: (1) the value of production and on-tree prices, (2) picking and hauling costs, (3) fresh citrus packing and selling costs, (4) citrus processing, warehousing, and selling costs, and (5) the wholesaling and retailing stage in the citrus production/marketing process.

#### **TRENDS IN PRODUCTION, VALUE OF PRODUCTION, AND ON-TREE PRICES**

Total citrus bearing acreage in Florida has declined from a high of 660,500 acres in 1970-71 to 530,000 acres in 1983-84 (Table 1). The decrease has resulted generally from decreases in orange and speciality fruit bearing acreage. Prior to 1970-71, orange, grapefruit and speciality fruit bearing acreage had increased. Grapefruit acreage has generally increased since 1963-64 with a decrease in 1983-84. In 1983-84, orange, grapefruit and speciality fruit accounted for 76, 17 and 7 percent of total citrus bearing acreage.

From 1963-64 through 1979-80, Florida citrus production had generally trended upward with some reversals due to weather (Table 2). Citrus production of oranges, grapefruit and speciality fruit had peaked in 1979-80 at 282 million boxes and has declined since. Orange production has declined 110 percentage points while grapefruit and speciality fruit have declined 46 and 111 percentage points. This is due primarily to the freezes that Florida had experienced during that time period.

Table 1. Florida citrus bearing acres by type of fruit, 1959-60 through 1983-84 seasons.

SEASON	All Round Orange		All Grapefruit		Specialty Fruit <sup>a</sup>		All Citrus		
	Bearing Acres	Index <sup>b</sup>	Bearing Acres	Index <sup>b</sup>	Bearing Acres	Index <sup>b</sup>	Bearing Acres	Bearing Acres	Index <sup>b</sup>
	1000 Acres	Percent	1000 Acres	Percent	1000 Acres	Percent	1000 Acres	Percent	Percent
1959-60	370.0	97	92.3	103	45.9	104	508.2	98	
1960-61	374.1	98	92.5	103	48.3	109	514.9	100	
1961-62	408.7	107	94.0	104	47.0	106	549.7	106	
1962-63	470.0	97	88.0	98	41.3	93	499.3	97	
1963-64	388.0	102	83.0	92	39.1	88	510.1	99	
1964-65	435.0	114	84.0	92	42.3	96	561.3	109	
1965-66	472.0	124	85.8	95	45.3	102	603.1	117	
1966-67	522.0	137	87.0	97	49.7	112	658.7	128	
1967-68	557.6	146	87.5	97	54.6	123	699.7	135	
1968-69	595.6	156	90.3	100	60.9	138	746.8	145	
1969-70	636.1	166	98.7	110	71.8	162	806.4	156	
1970-71	660.5	173	107.2	119	78.8	178	846.5	164	
1971-72	624.2	163	112.6	125	75.6	171	812.4	157	
1972-73	619.6	162	114.6	127	74.9	169	809.1	157	
1973-74	614.6	161	115.8	129	73.4	166	803.8	156	
1974-75	610.4	160	115.4	126	73.7	166	799.5	155	
1975-76	596.4	156	117.9	131	70.2	159	784.5	152	
1976-77	594.3	155	119.3	133	69.6	157	783.2	152	
1977-78	579.0	152	120.3	134	65.5	148	764.8	148	
1978-79	571.5	150	124.6	139	63.4	143	759.5	147	
1979-80	576.6	151	126.4	141	63.6	144	766.6	148	
1980-81	573.4	150	125.6	140	62.8	142	761.8	148	
1981-82	560.2	147	127.8	142	59.9	135	747.9	145	
1982-83	536.8	140	128.6	143	57.6	130	723.0	140	
1983-84	530.3	139	120.1	134	51.4	116	701.8	136	

Source: Florida Agricultural Statistics.

a. Includes temples, tangelos, tangerines, honey tangerines and limes.

b. Percentage of average value for 1959-60 through 1963-64 seasons.

Table 2. Florida citrus production by type of fruit, 1959-60 through 1983-84 seasons.

SEASON	All round oranges produced		All grapefruit produced		Specialty fruit <sup>a</sup> produced		All citrus produced	
	000's 1 3/5 bu. box	Percent index <sup>b</sup>	000's 1 3/5 bu. box	Percent index <sup>b</sup>	000's 1 3/5 bu. box	Percent index <sup>b</sup>	000's 1 3/5 bu. box	Percent index <sup>b</sup>
1959-60	87600	108	30500	100	7470	90	125570	104
1960-61	82700	102	31600	103	9980	120	124260	103
1961-62	108800	134	34800	114	10210	123	153810	124
1962-63	72500	89	30000	98	5250	62	107750	90
1963-64	54900	68	24300	86	5620	64	89320	75
1964-65	82400	101	31900	104	9350	113	123650	103
1965-66	95900	118	34900	114	10190	123	140990	117
1966-67	139500	172	43600	142	11995	142	194995	163
1967-68	100500	124	20900	107	10270	124	143670	114
1968-69	129700	150	39900	130	11500	138	181100	151
1969-70	137700	169	37400	120	12405	149	187505	154
1970-71	141300	175	42900	140	13250	150	197450	167
1971-72	137000	169	47000	152	14800	178	198800	169
1972-73	169700	209	45400	148	13200	159	228300	190
1973-74	165800	204	48100	157	14250	173	228250	190
1974-75	173300	213	44600	146	15850	191	233750	194
1975-76	181200	223	49100	160	17530	211	247830	206
1976-77	186800	230	51500	168	14250	172	252550	210
1977-78	167800	206	51400	168	12450	150	231650	193
1978-79	164000	202	50000	163	14830	174	229830	190
1979-80	206700	254	54800	179	20200	243	281700	234
1980-81	172400	212	50300	164	13800	166	236500	197
1981-82	125800	155	48100	157	13700	165	187600	156
1982-83	139600	172	39400	129	13600	164	192600	160
1983-84	116700	144	40900	133	10975	132	168575	140

Source: Florida Agricultural Statistics.

a. Includes Temple, tanglois, tangshines, Nancy tangshines and times.

b. Percentage of average value for 1959-60 through 1963-64 seasons (index).

From 1959-60 through 1968-69, the on-tree value of Florida's total citrus production had shown a mixed trend (Table 3). Starting in 1969-70 through 1979-80, the all-citrus category started an increasing trend with a few years of decreases. The on-tree value peaked in 1979-80 at \$1.03 billion for all citrus. Oranges and grapefruit on-tree value peaked during this year but speciality fruit peaked in 1978-79. Since 1979-80, the on-tree value of oranges has dropped 108 percentage points between 1979-80 and 1981-82, the value of grapefruit has dropped 286 points between 1979-80 and 1982-83, and speciality fruit has dropped 81 points between 1979-80 and 1983-84. A preliminary estimate shows the on-tree value for all citrus in 1984-85 to be \$1.044 billion, an increase over 1979-80 (Florida Crop, p. 1).

The average value per acre for all citrus peaked in 1979-80 at \$1339 (\$1338 in 1982-83) from a low of \$270 in 1966-67 (Table 4). The years since 1979-80 have been lower. Orange value per acre peaked in 1978-79 at \$1339 from a low of \$247 in 1969-70. Grapefruit value per acre reached a high of \$1442 in 1980-81 from a low of \$250 in 1961-62.

The on-tree price per box for all citrus was highest in 1982-83 at \$4.53 (Table 5). This represented an increase from a low in 1966-67 of \$.91 per box. Oranges and speciality fruit peaked in 1982-83 at \$5.15 and \$5.61 from a low of \$.94 and 1.27 in 1966-67. On the other hand, grapefruit on-tree price was highest in 1980-81 at \$3.60 per box which was an increase over a low of \$.67 in 1961-62.

Table 3. On-tree value of Florida citrus production by type of fruit, 1959-60 through 1983-84 seasons.

SEASON	All round orange		All grapefruit		Specialty fruit <sup>a</sup>		All citrus <sup>b</sup>	
	value	index <sup>c</sup>	value	index <sup>c</sup>	value	index <sup>c</sup>	value	index <sup>c</sup>
	1000 \$	Percent	1000 \$	Percent	1000 \$	Percent	1000 \$	Percent
1959-60	170057	80	32043	88	19635	82	221735	82
1960-61	244376	116	30138	83	25348	106	299862	110
1961-62	203255	96	23498	65	23506	98	250259	92
1962-63	196116	93	37146	102	17421	73	250683	92
1963-64	243935	115	59147	163	34005	142	337087	124
1964-65	200276	95	46892	129	27308	114	274476	101
1965-66	155625	74	47471	130	22312	93	225408	83
1966-67	130526	62	32393	89	15156	63	178075	65
1967-68	207432	98	66317	182	34321	143	308070	113
1968-69	218660	103	39011	107	27723	116	285394	105
1969-70	156876	74	63526	175	22055	92	242457	89
1970-71	208146	98	81514	224	24228	101	313888	115
1971-72	280317	133	108991	299	33991	142	423299	156
1972-73	265361	125	94635	260	29434	123	389430	143
1973-74	244691	116	79879	219	30692	128	355262	131
1974-75	280350	133	76367	210	36498	152	393215	145
1975-76	321449	152	72155	198	42552	177	436156	160
1976-77	405982	192	81116	223	38810	162	525908	193
1977-78	693677	328	84438	232	68219	284	846334	311
1978-79	764961	362	120128	330	77481	323	962570	354
1979-80	768877	363	181208	498	76639	320	1026724	378
1980-81	697231	330	181155	498	63776	266	942162	346
1981-82	538686	255	100597	276	65418	273	704701	259
1982-83	718420	340	77221	212	76225	318	871866	321
1983-84	578954	274	105009	289	57332	239	741295	273

Source: Florida Agricultural Statistics.

a. Includes Temples, tangelos, tangerines, honey tangerines and limes.

b. Includes all round oranges, all grapefruit and specialty fruit.

c. Percentage of average values for 1959-60 through 1963-64 seasons (Index).

Table 4. Average value of citrus production per acre of citrus by type of fruit, 1959-60 through 1983-84 seasons.

SEASON	All round orange value	All round orange index <sup>c</sup>	All grapefruit value	All grapefruit index <sup>c</sup>	Specialty fruit <sup>a</sup> value	Specialty fruit <sup>a</sup> index <sup>c</sup>	All citrus <sup>b</sup> value	All citrus <sup>b</sup> index <sup>c</sup>
	\$/acre	Percent	\$/acre	Percent	\$/acre	Percent	\$/acre	Percent
1959-60	459.62	83	347.16	84	427.78	78	436.31	83
1960-61	653.24	118	325.82	79	524.80	96	582.37	110
1961-62	497.32	90	249.98	61	500.13	91	455.43	86
1962-63	530.04	96	422.11	103	421.82	77	502.07	95
1963-64	628.70	114	712.61	173	869.69	158	660.83	125
1964-65	460.40	83	558.24	136	645.58	118	489.00	93
1965-66	329.71	60	553.28	134	492.54	90	373.75	71
1966-67	250.05	45	372.33	90	304.95	56	270.34	51
1967-68	372.01	67	757.91	184	628.59	115	440.29	83
1968-69	367.13	66	432.02	105	455.22	83	382.16	72
1969-70	246.62	45	643.63	156	308.03	56	300.67	57
1970-71	315.13	57	760.39	185	307.46	56	370.81	70
1971-72	449.08	81	967.95	235	449.62	82	521.05	99
1972-73	428.28	77	825.79	201	392.98	72	481.31	91
1973-74	398.13	72	689.80	168	418.15	76	441.98	84
1974-75	459.29	83	661.76	161	495.22	90	491.83	93
1975-76	538.98	97	612.00	149	605.15	110	555.97	105
1976-77	683.13	123	679.93	165	557.61	102	671.49	127
1977-78	1198.06	216	701.90	171	1041.51	190	1106.61	210
1978-79	1338.51	242	964.11	234	1222.10	223	1267.37	240
1979-80	1333.47	241	1433.61	348	1205.02	220	1339.32	254
1980-81	1215.96	220	1442.32	350	1015.54	185	1236.76	235
1981-82	961.60	174	787.14	191	1092.12	199	942.24	179
1982-83	1338.34	242	600.47	146	1323.35	241	1056.28	200
1983-84	1091.75	197	874.35	212	1115.41	203	1073.71	204

Source: Florida Agricultural Statistics.

a. Includes lemons, tangelos, tangerines, honey tangerines and limes.

b. Includes all round oranges, all grapefruit and specialty fruit.

c. Percentage of average values for 1959-60 through 1963-64 seasons (Index).

Table 5. On--tree price per box of Florida citrus by type of fruit, 1959-60 through 1983-84 seasons.

SEASON	All round orange price	All round orange index <sup>C</sup>	All grapefruit price	All grapefruit index <sup>C</sup>	Specialty fruit <sup>a</sup> price	Specialty fruit <sup>a</sup> index <sup>C</sup>	All citrus <sup>b</sup> price	All citrus <sup>b</sup> index <sup>C</sup>
	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent
1959-60	1.96	70	1.05	85	2.62	89	1.76	74
1960-61	2.98	107	0.96	78	2.53	86	2.41	101
1961-62	1.88	67	0.67	54	2.30	78	1.63	68
1962-63	2.71	97	1.24	101	3.32	113	2.33	98
1963-64	4.44	159	2.24	182	3.94	134	3.75	158
1964-65	2.43	87	1.47	120	2.92	99	2.22	93
1965-66	1.62	58	1.36	111	2.19	74	1.60	67
1966-67	0.94	34	0.74	60	1.27	43	0.91	38
1967-68	2.07	74	2.01	163	3.34	114	2.14	90
1968-69	1.68	60	0.98	80	2.41	82	1.58	66
1969-70	1.14	41	1.70	138	1.78	61	1.29	54
1970-71	1.46	52	1.91	155	1.83	62	1.58	66
1971-72	2.04	73	2.32	189	2.30	78	2.13	89
1972-73	1.56	56	2.08	169	2.23	76	1.71	72
1973-74	1.47	53	1.66	135	2.14	73	1.56	66
1974-75	1.62	58	1.72	140	2.30	78	1.68	71
1975-76	1.77	63	1.47	120	2.43	83	1.76	74
1976-77	2.17	78	1.58	128	2.72	93	2.08	87
1977-78	4.14	148	1.64	133	5.48	186	3.65	153
1978-79	4.66	167	2.41	196	5.20	177	4.21	177
1979-80	3.72	133	3.31	269	3.79	129	3.64	153
1980-81	4.04	145	3.60	293	4.62	157	3.98	167
1981-82	4.28	153	2.09	170	4.78	163	3.76	158
1982-83	5.15	185	1.96	159	5.61	191	4.53	190
1983-84	4.96	178	2.57	209	5.22	178	4.40	185

Source: Florida Agricultural Statistics.

a. Includes Temples, tangelos, tangerines, honey tangerines and limes.

b. Includes all round oranges, all grapefruit and specialty fruit.

c. Percentage of average prices for 1959-60 through 1963-64 seasons (Index).



## HARVESTING AND HAULING COSTS

Harvesting and hauling represent the first process in the marketing channel from grove to consumer. Harvesting also represents the least mechanized and most labor intensive operation in the marketing channel. While mechanical harvesting may, in the future, work to deter the increasing harvesting costs, mechanical harvesting adoption has been slow.

Picking and hauling costs for oranges have generally trended upward to \$1.67 per 1-3/5 bushel box in 1981-82 from a low of \$.44 in 1961-62 (Table 6). Picker labor was the largest component of total costs in 1981-82 (44 percent). Other labor represented 28 percent of total costs. Picking labor and other labor have risen 254 and 271 percent between the 1960-64 base period and 1981-82. Other cost categories increased by a lower percentage.

Grapefruit picking and hauling costs generally trended upward and reached a high of \$1.28 per box in 1981-82 (Table 7). The low was \$.36 per box in 1959-60. Picker labor represents the largest component of total cost and was 37 percent of total cost in 1981-82. Other labor represented the second largest component and was 32 percent of total costs in 1981-82. Picker labor and other labor had increased 222 and 262 percent between the 1960-64 base period and 1981-82. The remaining cost categories increased at a lower percentage.

Tangerine picking and hauling costs have generally trended upward and were at a high of \$2.45 per box in 1981-82 (Table 8). The low was \$.92 in 1961-62. Picker labor represented 50 percent of total cost in

Table 6. Picking and hauling costs and indices for Florida oranges, 1959-60 through 1982-83 seasons.

SEASON	Picker labor cost		Other labor <sup>a</sup> cost		Fuel, maintenance, depreciation cost		Fuel, maintenance, depreciation index <sup>c</sup>		Administrative & other cost <sup>b</sup>		Total cost		Total index <sup>c</sup>	
	c/box	Percent	c/box	Percent	c/box	Percent	c/box	Percent	c/box	Percent	c/box	Percent	c/box	Percent
1959-60	18.77	90	10.59	84	8.43	94	7.61	113	45.40	93				
1960-61	18.90	91	12.52	100	8.37	94	6.34	94	46.13	94				
1961-62	19.64	94	12.17	97	7.56	85	4.83	72	44.20	90				
1962-63	22.50	108	13.29	106	9.98	112	6.74	100	52.51	107				
1963-64	24.24	116	14.17	113	10.33	116	8.03	120	56.77	116				
1964-65	26.38	127	13.35	106	9.72	109	5.64	84	55.09	112				
1965-66	28.54	137	14.43	115	9.88	111	5.23	78	58.08	119				
1966-67	29.53	142	13.79	110	8.42	94	5.25	78	56.99	116				
1967-68	33.42	161	16.96	135	10.88	122	6.15	92	67.41	138				
1968-69	37.51	180	15.69	125	10.82	121	5.73	85	69.75	142				
1969-70	38.51	185	17.00	135	12.32	138	6.44	96	74.30	152				
1970-71	38.70	186	17.99	143	12.75	143	8.46	126	77.90	159				
1971-72	40.91	197	22.34	178	13.38	150	7.83	117	84.47	172				
1972-73	52.60	253	22.00	175	15.06	169	7.20	107	98.86	202				
1973-74	57.86	278	23.10	184	16.57	186	9.21	137	106.74	218				
1974-75	51.87	249	22.87	182	16.53	185	8.25	123	99.52	203				
1975-76	50.61	243	25.52	203	17.38	195	7.20	107	100.71	206				
1976-77	54.96	264	27.60	220	19.29	216	9.34	139	111.19	227				
1977-78	58.96	283	33.46	267	20.34	228	10.92	163	123.68	252				
1978-79	65.76	316	40.31	321	23.32	261	11.08	165	140.47	287				
1979-80	67.82	326	39.60	316	25.47	265	12.32	184	145.21	296				
1980-81	72.92	350	44.37	354	26.83	300	13.80	206	157.92	322				
1981-82	73.64	354	46.56	371	28.43	318	18.40	274	167.03	341				
1982-83	68.72	330	44.14	352	26.31	295	17.43	260	156.60	320				

Source: Hooks and Kilmer.

a. Supervisory, loaders, drivers, semi-drivers, miscellaneous and payroll taxes and workman's compensation.

b. Insurance, taxes, licenses, supplies, equipment rental, migratory labor, miscellaneous costs.

c. Percent of average value for 1959-60 through 1963-64 seasons (Index).

Table 7. Picking and hauling costs and indices for Florida grapefruit, 1959-60 through 1982-83 seasons.

SEASON	Picker labor cost	Picker labor index <sup>c</sup>	Other labor <sup>a</sup> cost	Other labor <sup>a</sup> index <sup>c</sup>	Fuel, maintenance, depreciation cost	Fuel, maintenance, depreciation index <sup>c</sup>	Administrative & other cost <sup>b</sup>	Administrative & other index <sup>b,c</sup>	Total cost	Total index <sup>c</sup>
	c/box	Percent	c/box	Percent	c/box	Percent	c/box	Percent	c/box	Percent
1959-60	13.55	92	10.42	92	7.14	87	4.77	96	35.88	91
1960-61	13.84	94	11.25	99	8.13	100	4.64	93	37.86	96
1961-62	14.31	97	10.93	96	7.09	87	3.83	77	36.16	92
1962-63	15.11	102	11.66	103	9.05	111	5.44	109	41.26	105
1963-64	17.19	116	12.40	109	9.43	115	6.18	124	45.20	115
1964-65	18.78	127	12.83	113	8.97	110	4.16	84	44.74	114
1965-66	21.18	143	13.51	119	10.29	126	4.75	96	49.73	127
1966-67	21.75	147	13.55	120	8.86	108	4.23	85	48.39	123
1967-68	24.21	164	15.36	136	10.59	130	4.61	93	54.77	139
1968-69	25.39	172	14.60	129	10.48	128	4.50	91	54.97	140
1969-70	26.86	181	16.59	146	11.68	143	5.03	101	60.16	153
1970-71	26.73	181	16.96	150	12.18	149	5.78	116	61.65	157
1971-72	28.68	194	18.40	162	12.66	155	6.28	126	66.02	168
1972-73	33.86	229	20.22	178	14.28	175	5.45	110	73.81	188
1973-74	38.75	262	23.02	203	15.54	190	7.72	155	85.03	217
1974-75	38.54	260	22.52	199	15.70	192	6.54	132	83.30	212
1975-76	38.46	260	22.72	201	17.52	214	5.80	117	84.50	215
1976-77	39.64	268	24.81	219	18.94	232	7.42	149	90.81	231
1977-78	41.00	277	30.27	267	20.64	253	8.34	168	100.25	255
1978-79	44.41	300	34.74	307	23.10	283	8.08	163	110.33	281
1979-80	45.16	305	36.69	324	23.99	294	9.13	184	114.97	293
1980-81	45.10	305	46.51	411	24.31	298	10.63	214	126.55	322
1981-82	47.73	322	41.05	362	25.55	313	13.19	265	127.52	325
1982-83	48.20	326	41.84	369	24.04	294	12.94	260	127.02	323

Source: Hooks and Kilmer.

a. Supervisory, loaders, drivers, semi-drivers, miscellaneous and payroll taxes and workman's compensation.

b. Insurance, taxes, licenses, supplies, equipment rental, migratory labor, miscellaneous costs.

c. Percent of average value for 1959-60 through 1963-64 seasons (Index).

Table 8. Picking and hauling costs and indices for Florida tangerines, 1956-60 through 1982-83 seasons.

SEASON	Picker labor cost	Picker labor index <sup>c</sup>	Other labor <sup>a</sup> cost	Other labor <sup>a</sup> index <sup>c</sup>	Fuel, maintenance, depreciation cost	Fuel, maintenance, depreciation index <sup>c</sup>	Administrative & other cost <sup>b</sup>	Administrative & other index <sup>bc</sup>	Total cost	Total index <sup>c</sup>
	c/box	Percent	c/box	Percent	c/box	Percent	c/box	Percent	c/box	Percent
1959-60	58.06	93	18.03	93	8.19	85	9.85	104	94.13	93
1960-61	57.11	92	18.86	97	9.73	101	9.00	95	94.70	94
1961-62	59.79	96	17.78	92	7.89	82	6.61	70	92.07	91
1962-63	66.86	107	20.33	105	11.01	114	10.71	113	108.91	108
1963-64	69.83	112	21.83	113	11.41	118	11.37	120	114.44	113
1964-65	73.57	118	21.68	112	10.59	110	8.45	89	114.29	113
1965-66	75.03	120	24.19	125	11.04	114	9.17	96	119.43	118
1966-67	79.55	128	26.18	135	9.64	100	8.84	93	124.21	123
1967-68	82.66	133	27.52	142	12.03	125	9.57	101	131.78	131
1968-69	83.73	134	27.71	143	12.19	126	8.90	94	132.53	131
1969-70	91.02	146	29.33	151	13.63	141	9.02	95	143.00	142
1970-71	87.52	140	33.16	171	14.85	154	12.02	126	147.55	146
1971-72	87.99	141	39.61	204	15.60	162	10.87	114	154.07	153
1972-73	96.22	154	37.49	194	17.39	180	10.75	113	161.85	160
1973-74	100.38	161	42.19	218	18.85	195	12.33	130	173.75	172
1974-75	104.19	167	40.01	207	18.30	190	11.09	117	173.59	172
1975-76	102.97	165	41.41	214	19.55	203	9.34	98	173.27	172
1976-77	108.88	175	46.64	241	21.43	222	14.40	151	191.35	190
1977-78	110.06	177	56.20	290	23.13	240	14.34	151	203.73	202
1978-79	110.08	177	60.58	313	23.33	242	14.37	151	208.36	207
1979-80	130.85	210	61.17	316	29.05	301	19.00	200	240.07	238
1980-81	123.17	198	62.54	323	30.12	312	16.98	179	232.81	231
1981-82	123.08	197	70.10	362	30.10	312	21.64	228	244.92	243
1982-83	125.23	201	69.98	361	27.83	288	20.12	212	243.16	241

Source: Hooks and Kilmer.

a. Supervisory, loaders, drivers, semi-drivers, miscellaneous and payroll taxes and workman's compensation.

b. Insurance, taxes, licenses, supplies, equipment rental, migratory labor, miscellaneous costs.

c. Percent of average value for 1959-60 through 1963-64 seasons (Index).

1981-82 and other labor represented 29 percent. Picker labor and other labor had increased 97 and 262 percent between the base period of 1960-64 and 1981-82. The other cost categories increased more than picker labor and less than other labor.

### **FRESH PACKING AND SELLING COSTS**

While over 94 percent of oranges, 53 percent of grapefruit and 26 percent of tangerines are generally used in processed citrus products (Figure 1), the total volume of Florida citrus packed for fresh shipment had increased every season from 1968-69 through 1975-76 (Figure 2). Since then, total shipments have generally trended downward and have not returned to the 1975-76 level of 37.9 million boxes. Grapefruit peaked in 1975-76 at 19.4 million boxes, oranges in 1974-75 at 15.2 million boxes, and tangerines in 1979-80 at 3.6 million boxes. For some growers, the fresh market is the primary market and packing cost is the second key cost element in the marketing channel that affects on-tree grower returns.

The 4/5 bushel fiberboard carton is the predominant container used. For the 1980-81 season, 71 and 64 percent of commercial orange and tangerine shipments and 89 percent of commercial grapefruit shipments were in the 4/5 bushel corrugated carton. Total packing and selling costs for oranges and grapefruit have generally trended upward since 1959-60 (Tables 9 and 10). Total packing and selling costs were highest in 1981-82 at \$3.80 and \$3.57 per 1-3/5 bushel box for oranges

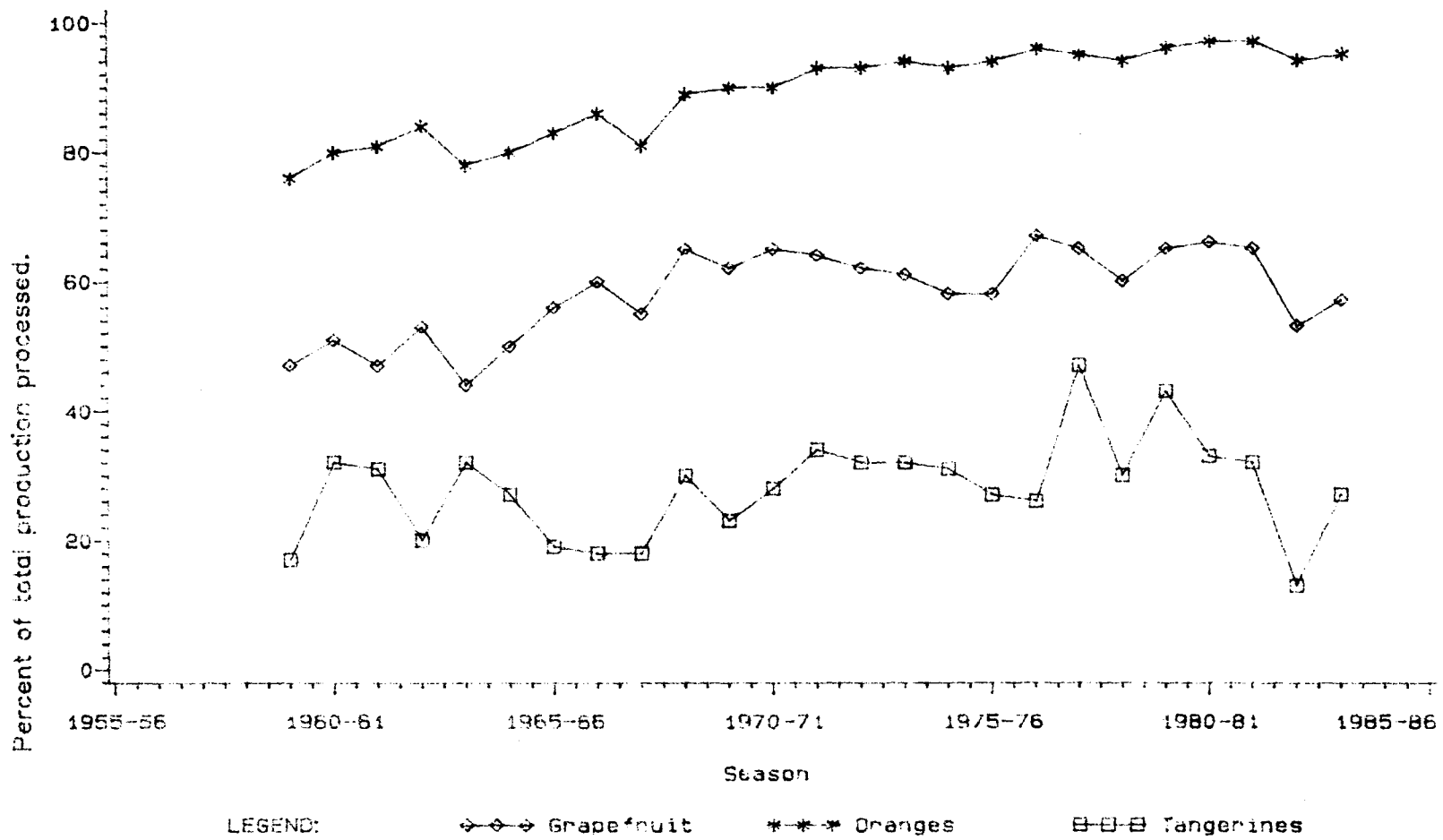
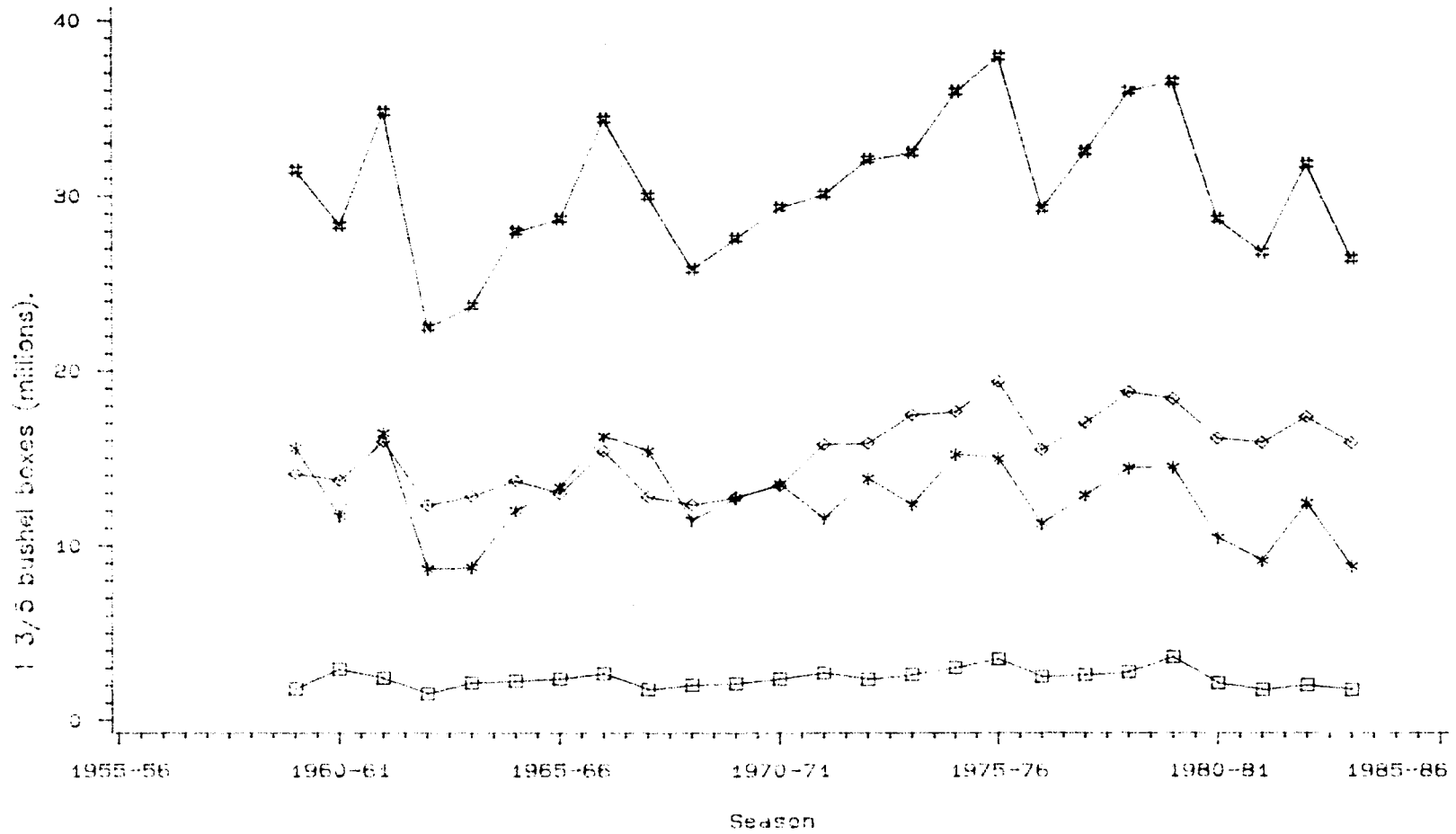


Figure 1. Utilization of Florida citrus from 1959-60 through 1983-84 growing seasons.

Source: Florida Cannery Association.



LEGEND:      ◆◆◆ Grapefruit      \*-\*-\* Oranges      □□□ Tangerines      #-#-# Total

Figure 2. Certified fresh citrus fruit shipments from Florida, 1959-60 through 1983-84 seasons.

Source: Fla. Div. of Fruit and Vegetable Inspection.

Table 9. Relative changes in the cost components that make up the total cost of packing 1--3/5 bushels of Florida oranges in 4/5 bushel cartons, 1959--60 through 1981--82 seasons.

	Materials cost		Labor cost		Direct operating <sup>a</sup>		Indirect operating <sup>b</sup>		Indirect operating <sup>b</sup>		Selling, administrative & other <sup>c</sup>		Total packing & selling	
	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent
SEASON														
1959-60	0.4649	99	0.3697	90	0.0805	89	0.0739	92	0.2758	86	1.2648	92		
1960-61	0.4818	103	0.3998	98	0.0896	100	0.0833	104	0.2784	87	1.3329	97		
1961-62	0.4857	103	0.4012	98	0.0850	94	0.0693	87	0.2776	87	1.3188	96		
1962-63	0.4639	99	0.4507	110	0.1076	120	0.0915	114	0.3819	119	1.4956	109		
1963-64	0.4372	93	0.4277	104	0.0926	103	0.0804	101	0.3823	119	1.4202	104		
1964-65	0.4432	94	0.4531	111	0.0906	101	0.0776	97	0.3749	117	1.4395	105		
1965-66	0.4634	99	0.4795	117	0.0926	103	0.0843	105	0.3743	117	1.4941	109		
1966-67	0.4723	100	0.4790	117	0.0850	94	0.0820	102	0.3667	113	1.4850	108		
1967-68	0.4645	99	0.5182	126	0.1059	118	0.0877	110	0.3950	123	1.5713	115		
1968-69	0.4637	99	0.5415	132	0.1273	141	0.1053	132	0.3977	124	1.6355	119		
1969-70	0.4756	101	0.4938	120	0.1185	132	0.1019	127	0.4734	148	1.6632	121		
1970-71	0.4699	100	0.5187	127	0.1275	142	0.1361	170	0.4756	149	1.7278	126		
1971-72	0.4440	94	0.5765	141	0.1484	165	0.1534	192	0.4885	153	1.8108	132		
1972-73	0.4984	106	0.6037	147	0.1397	155	0.1243	155	0.4986	156	1.8647	136		
1973-74	0.5751	122	0.6601	161	0.1700	189	0.1616	202	0.5247	164	2.0915	153		
1974-75	0.6747	144	0.6449	157	0.1829	203	0.1265	158	0.5476	171	2.1766	159		
1975-76	0.7082	151	0.6493	158	0.1829	203	0.1287	161	0.5464	171	2.2155	162		
1976-77	0.7144	152	0.7768	189	0.2565	285	0.1941	243	0.6614	207	2.6032	190		
1977-78	0.6988	149	0.7541	184	0.2102	234	0.1673	209	0.6286	196	2.4590	179		
1978-79	0.7668	163	0.8011	195	0.2523	280	0.1785	223	0.6365	199	2.6352	192		
1979-80	0.8871	189	0.9151	223	0.2969	330	0.1872	234	0.6380	199	2.9243	213		
1980-81	0.9776	208	1.1075	270	0.4181	465	0.2784	348	0.8687	271	3.6503	266		
1981-82	1.0299	219	1.1598	283	0.3327	370	0.2529	316	1.0218	319	3.7971	277		

Source: Hooks and Kilmer.

- a. Direct operating expenses include power, lights, water, repair, maintenance and other miscellaneous supplies.
- b. Indirect operating expenses include insurance, taxes, licenses, depreciation and rent.
- c. Percent of average value for 1959-60 through 1963-64 seasons.



Table 10. Relative changes in the cost components that make up the total cost of packing 1-3/5 bushels of Florida grapefruit in 4/5 bushel cartons, 1959-60 through 1981-82 seasons.

SEASON	Materials cost		Labor cost		Direct operating <sup>a</sup>		Indirect operating <sup>b</sup>		Selling, administrative & other <sup>c</sup>		Total packing & selling	
	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent
1959-60	0.5379	115	0.2914	86	0.0581	97	0.0405	81	0.2793	92	1.2642	100
1960-61	0.5193	100	0.3020	89	0.0608	101	0.0430	86	0.2791	93	1.2042	96
1961-62	0.5242	101	0.3492	103	0.0594	99	0.0545	109	0.2946	98	1.2819	102
1962-63	0.4815	83	0.3621	106	0.0723	120	0.0551	113	0.3144	105	1.2857	102
1963-64	0.4534	87	0.3733	110	0.0646	108	0.0607	121	0.3337	111	1.2857	102
1964-65	0.4721	91	0.4038	119	0.0772	129	0.0663	133	0.3519	117	1.3713	109
1965-66	0.4855	92	0.4204	124	0.0753	125	0.0675	135	0.3628	121	1.4120	112
1966-67	0.4952	93	0.4192	123	0.0666	111	0.0666	134	0.3651	122	1.4129	112
1967-68	0.4918	92	0.4862	143	0.0919	153	0.0850	170	0.4009	134	1.5558	123
1968-69	0.4752	91	0.5087	150	0.1024	171	0.0974	195	0.3843	128	1.5689	125
1969-70	0.4756	91	0.4938	147	0.1155	197	0.1019	204	0.4734	158	1.6632	132
1970-71	0.4464	84	0.5005	149	0.1196	199	0.1083	217	0.4914	164	1.7112	136
1971-72	0.4718	91	0.5273	155	0.1217	203	0.1017	203	0.4965	166	1.7187	136
1972-73	0.5193	99	0.5147	151	0.1193	199	0.1068	214	0.5181	173	1.7739	141
1973-74	0.5317	116	0.6210	183	0.1430	238	0.1484	297	0.5471	182	2.0612	164
1974-75	0.6903	133	0.6347	187	0.1954	326	0.1346	269	0.5520	184	2.2070	175
1975-76	0.7517	143	0.6175	181	0.1752	292	0.1403	281	0.5864	195	2.2711	180
1976-77	0.7542	144	0.7256	214	0.2232	372	0.1613	323	0.6814	227	2.5537	203
1977-78	0.7301	145	0.7457	219	0.1979	330	0.1454	291	0.6435	215	2.4326	193
1978-79	0.7488	144	0.7771	239	0.2166	361	0.1446	289	0.6864	229	2.6235	208
1979-80	0.9175	176	0.8375	246	0.2501	417	0.1477	295	0.7388	246	2.8915	229
1980-81	1.0226	199	1.0461	319	0.3407	558	0.1913	383	0.9144	305	3.5651	283
1981-82	1.0585	204	1.0354	305	0.3311	502	0.1758	352	1.0007	334	3.5715	283

Source: Hooks and Kilmer.

a. Direct operating expenses include power, lights, water, repair, maintenance and other miscellaneous supplies.

b. Indirect operating expenses include insurance, taxes, licenses, depreciation and rent.

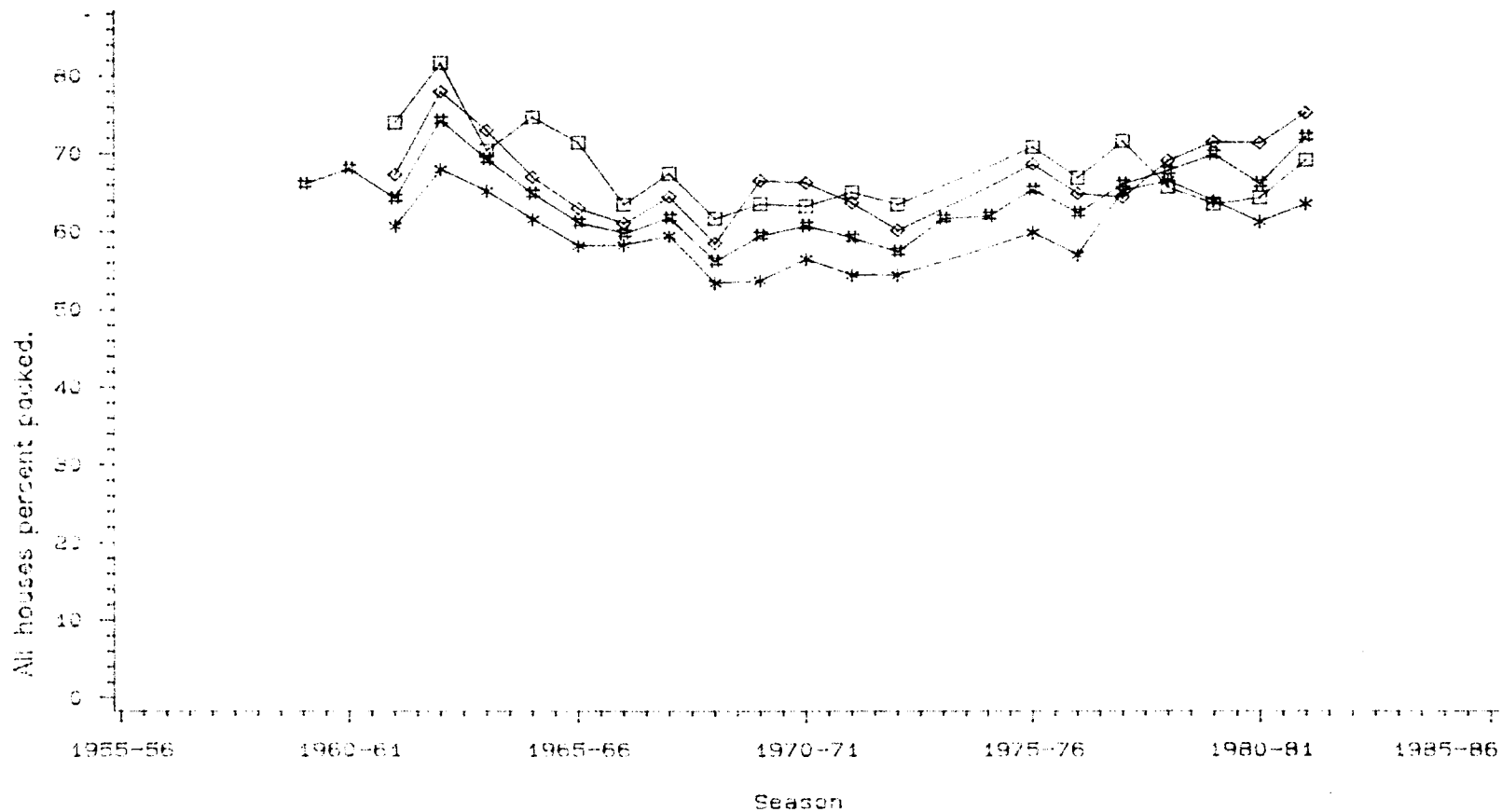
c. Percent of average value for 1959-60 through 1963-64 seasons.

and grapefruit, up from a low of \$1.26 and \$1.20 in 1959-60 and 1960-61.

All expense categories have not risen by the same proportions. Direct operating costs which includes power, lights, water, repairs, maintenance and other miscellaneous supplies have increased more relative to the base period than any other category. The direct operating index for oranges and grapefruit in 1981-82 was 370 and 502. Direct operating costs represented only 8.8 (8.4) percent of orange (grapefruit) packing cost in 1981-82 whereas materials, labor, and selling costs represented 27.1 (29.6), 30.5 (29), and 26.9 (28) percent for oranges and grapefruit during the same period.

The packout percentage generally trended downward during the 1960's and started trending upward during the 1970's (Figure 3). The highest percentage since 1962-63 when the percentage packout was 74.3 percent occurred in 1981-82 with a percentage of 72. Grapefruit generally has a percentage packout above that of oranges.

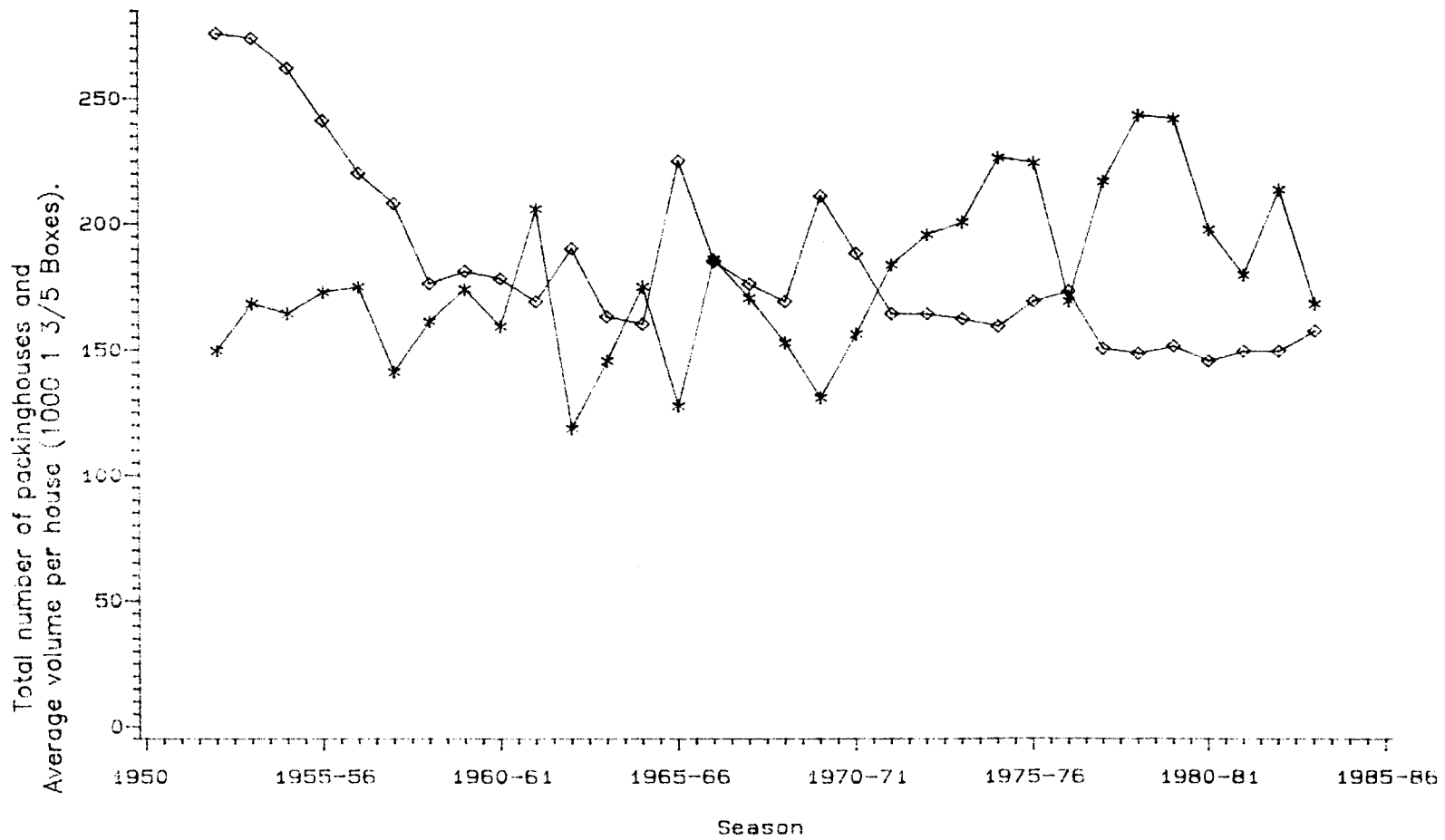
Not only have the total fresh fruit shipments been trending downward since 1975-76, average packinghouse volume and the number of Florida packinghouses has generally trended downward (Figure 4). The highest average packinghouse volume occurred in 1978-79 at 242,771 boxes, up from a low of 118,340 boxes in 1962-63. Packinghouse numbers, on the other hand, reached a low of 145 in 1980-81 from a high of 276 in 1952-53.



LEGEND:      ◊-◊-◊ Grapefruit      \*-\*-\* Oranges      □-□-□ Tangerines      #-#-# Total

Figure 3. Proportion of Florida citrus delivered to packinghouses that is actually packed, 1959-60 through 1981-82.

Source: Hooks; Kilmer.



LEGEND: \*-\*-\* House Volume      ◇-◇-◇ Number of Houses  
 Figure 4. Certified fresh citrus shippers in Florida and average volume per packinghouse, 1959-60 through 1983-84.

Source: Fla Div. of Fruit and Vegetable Inspection.

### PROCESSING, WAREHOUSING AND SELLING

Over 94 percent of oranges and 53 percent of grapefruit enter the processing channel instead of the fresh fruit channel (Figure 1). The processing channel is a multiple product channel in which frozen concentrate, chilled and canned products are produced. In order to simplify presentation, the major product for oranges and grapefruit will be used to illustrate the cost trends. The major product is based on the product form the oranges and grapefruit are initially used in, not the form that the consumer consumes (e.g., chilled is generally made from concentrate).

For oranges, frozen concentrate is the dominant product form (Table 11). In 1967-68, 72.5 percent of the oranges used in processed products were transformed to concentrate. This percent has generally trended upward to a level of 86 percent in 1983-84. Canned single strength and chilled single strength juice have trended downward over time from a high of 14.6 and 19.7 percent in 1962-63 and 1967-68 to 1.8 and 11.6 percent in 1982-83 and 1980-81. Total boxes processed reached a high in 1979-80 of 205 million boxes and has trended downward since.

Orange processing, warehousing and selling cost has generally trended upward since 1961-62 when total cost was \$2.02 per box (Table 12). In 1981-82, total cost was \$4.91 per box. Cost categories have tended to increase at different relative rates over time. Warehousing cost has increased the most. However, warehousing cost represented only 6.6 percent of total cost in 1981-82. Materials, other process-

Table 11. Utilization of oranges and Temples by type of processed products, 1959-60 through 1983-84 seasons.

SEASON	Canned single-strength juice, sect. & sid		Canned s.s. juice, section & salads index		Frozen concentrate <sup>a</sup> index		Chilled juice, sections, and salads index		Chilled juice, sections, & salads index		Total processed cost		Total processed index	
	1000 boxes	Percent	1000 boxes	Percent	1000 boxes	Percent	1000 boxes	Percent	1000 boxes	Percent	1000 boxes	Percent	1000 boxes	Percent
1959-60	10231	14.6	51957	74.3	7769	11.1	69957	100						
1960-61	7309	10.5	56039	80.5	6297	9.0	69645	100						
1961-62	9673	10.6	73986	80.7	7970	8.7	91629	100						
1962-63	9084	14.6	47176	75.7	6066	9.7	62326	100						
1963-64	5467	12.1	34206	75.6	5548	12.3	45221	100						
1964-65	6933	10.0	54511	78.7	7833	11.3	69277	100						
1965-66	7879	9.5	61853	74.7	13109	15.8	82841	100						
1966-67	9960	8.0	96857	78.0	17289	13.9	124106	100						
1967-68	6668	7.8	61988	72.5	16841	19.7	85497	100						
1968-69	9064	7.6	92167	76.9	18629	15.5	119860	100						
1969-70	7952	6.2	100776	78.6	19482	15.2	128210	100						
1970-71	8622	6.5	103554	78.1	20476	15.4	132652	100						
1971-72	7216	5.5	104410	79.3	20038	15.2	131664	100						
1972-73	8766	5.4	132211	81.6	21135	13.0	162112	100						
1973-74	7284	4.5	132475	82.4	21056	13.1	160815	100						
1974-75	7102	4.3	135515	81.7	23311	14.0	165928	100						
1975-76	6890	3.9	144527	82.1	24628	14.0	176045	100						
1976-77	7937	4.3	147782	80.6	27628	15.1	183347	100						
1977-78	7784	4.7	130929	79.6	25790	15.7	164503	100						
1978-79	6546	4.1	129124	81.3	23108	14.6	158778	100						
1979-80	7098	3.5	173229	84.5	24739	12.1	205066	100						
1980-81	6369	3.7	144322	84.6	19867	11.6	170558	100						
1981-82	4297	3.4	104355	83.4	16518	13.2	125170	100						
1982-83	2398	1.8	114343	84.7	18254	13.5	134995	100						
1983-84	2371	2.2	94016	86.0	12910	11.8	109297	100						

Source: Florida Citrus Mutual.

a. Includes oranges used in blended concentrates and processed hot pack concentrate orange juice.

Table 12. Costs of processing, warehousing and selling Florida concentrated orange juice in 48/6-ounce cans in cases, 45 degree Brix, 1959-60 through 1982-83 seasons.

SEASON	Materials cost		Processing labor cost		Other processing expenses		Warehousing cost		Selling, administrative & other expenses		Total processing cost	
	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent
1959-60 <sup>C</sup>	1.1769	108	0.2459	102	0.4135	94	0.0812	74	0.2849	59	2.2024	93
1960-61 <sup>C</sup>	1.1368	104	0.2422	101	0.4245	96	0.0838	76	0.3000	62	2.1873	93
1961-62 <sup>C</sup>	1.0586	97	0.1743	73	0.3168	72	0.1232	112	0.3485	73	2.0214	86
1962-63 <sup>C</sup>	1.0283	94	0.2588	108	0.6065	138	0.1487	135	0.6138	128	2.6561	113
1963-64 <sup>C</sup>	1.0300	94	0.2892	120	0.4430	101	0.1209	110	0.8403	175	2.7234	115
1964-65	0.9789	90	0.2167	90	0.3716	84	0.1198	109	0.4535	94	2.1405	91
1965-66	0.9982	92	0.2656	111	0.3782	86	0.1234	112	0.6126	128	2.3780	101
1966-67	1.0208	94	0.2117	88	0.2759	63	0.1053	96	0.4526	94	2.0663	88
1967-68	1.0128	93	0.2729	114	0.3705	84	0.1395	127	0.4593	96	2.2550	96
1968-69	1.0279	94	0.2776	116	0.3380	77	0.1112	101	0.4853	101	2.2408	95
1969-70	1.0271	94	0.2943	123	0.3355	76	0.1278	116	0.5990	125	2.3837	101
1970-71	1.0627	97	0.2881	120	0.3769	86	0.1354	123	0.5641	118	2.4272	103
1971-72	1.0771	99	0.2666	111	0.3728	85	0.1147	104	0.5539	115	2.3851	101
1972-73	1.1815	108	0.2978	124	0.4170	95	0.1358	123	0.5789	121	2.8640	113
1973-74	1.3285	122	0.3865	161	0.4864	111	0.1930	175	0.6283	131	3.0227	128
1974-75	1.6534	152	0.3654	152	0.5130	117	0.2240	204	0.6637	138	3.4195	145
1975-76	1.5213	140	0.3394	141	0.5468	124	0.2005	182	0.6359	132	3.2439	137
1976-77	1.4557	134	0.4463	186	0.6302	143	0.2196	200	0.7366	153	3.4884	148
1977-78	1.5049	138	0.4517	188	0.6854	156	0.2204	200	0.7661	160	3.6285	154
1978-79	1.6011	147	0.4515	188	0.6615	150	0.2268	206	0.8188	171	3.7597	159
1979-80	1.7419	160	0.4779	199	0.6954	158	0.2310	210	0.7604	158	3.9066	166
1980-81	1.8718	172	0.6035	251	0.9106	207	0.2998	273	1.0552	220	4.7409	201
1981-82 <sup>d</sup>	1.9246	177	0.6225	259	0.9407	214	0.3227	293	1.1021	230	4.9126	208
1982-83 <sup>e</sup>	1.9252	177	0.5879	245	0.9316	212	0.3283	298	0.9932	207	4.7662	202

Source: Hooks and Kilmer.

a. Includes utilities, maintenance and repairs, depreciation, rent, taxes, insurance, and miscellaneous other expenses.

b. Percent of average value for 1959-60 through 1963-64 seasons (Index).

c. 42 degree Brix.

d. 43.4 degree Brix.

e. 42 degree Brix.

ing expenses, and selling costs represented 39.2, 19.1 and 22.4 percent in 1981-82.

Carryover has generally increased over time from a low of 9.7 million gallons in 1959-60 to a high of 66.4 million gallons in 1980-81 (Table 13). Warehousing cost has generally increased from a low of \$.036 per gallon of FCOJ in 1959-60 to a high of \$.146 in 1982-83.

For grapefruit, the dominant product form is frozen concentrated grapefruit juice (Table 14). The percentage of grapefruit used in canned single strength grapefruit juice declined from a high of 80.8 percent in 1959-60 to 14 percent in 1983-84 while frozen concentrated grapefruit juice increased from a low of 9.9 percent in 1967-68 to a high of 80.4 percent in 1983-84. Chilled single strength grapefruit juice generally trended upward through 1975-76 and has trended downward since. The total number of 1-3/5 bushel boxes of grapefruit that are processed has generally increased from 11.6 million boxes in 1963-64 to a high of 35.4 million boxes in 1979-80 and has trended downward since.

A cost series for frozen concentrated grapefruit juice started in 1970-71; therefore, canned single strength juice will be used to illustrate the cost trends starting in 1959-60 (Table 15). Total processing cost has generally increased from a low of \$1.50 per case in 1959-60 to \$4.93 in 1982-83. Over that time period, other processing expenses which includes utilities, maintenance and repairs, depreciation, rent, taxes, insurance, and miscellaneous other expenses has increased by the largest percentage (357 percent). However, other processing expenses represented 13 percent of total expenses in 1982-



Table 13. Warehousing cost, carryover ending stocks and indices for Florida FCOJ, 1959-60 through 1983-84 seasons.

SEASON	Total December <sup>a</sup> carryover mil. gal.	Total December <sup>b</sup> carryover index	Warehousing cost per gallon <sup>c</sup>	Warehousing cost index <sup>b</sup>
	45 Brix	Percent	45 Brix	Percent
	1959-60 <sup>d</sup>	9.663	61	0.0361
1960-61 <sup>d</sup>	13.631	87	0.0372	75
1961-62 <sup>d</sup>	33.750	215	0.0548	110
1962-63 <sup>d</sup>	11.399	73	0.0661	133
1963-64 <sup>d</sup>	10.136	64	0.0537	108
1964-65	21.814	139	0.0532	107
1965-66	12.828	82	0.0548	111
1966-67	27.225	173	0.0468	94
1967-68	12.885	82	0.0620	125
1968-69	17.400	111	0.0494	100
1969-70	26.566	169	0.0568	115
1970-71	22.568	144	0.0602	121
1971-72	28.000	178	0.0510	103
1972-73	48.431	308	0.0604	122
1973-74	48.861	311	0.0858	173
1974-75	50.759	323	0.0996	201
1975-76	53.709	342	0.0891	180
1976-77	25.526	162	0.0976	197
1977-78	30.909	197	0.0980	197
1978-79	37.386	238	0.1008	203
1979-80	54.856	349	0.1027	207
1980-81	66.353	422	0.1332	269
1981-82 <sup>e</sup>	53.379	340	0.1434	289
1982-83 <sup>f</sup>	42.824	272	0.1459	294
1983-84 <sup>f</sup>	54.420	346	.	.

a. Source: Florida Canner's Association.

b. Percent of average value for 1959-60 through 1963-64 seasons (Index).

c. Source: Hooks; Hooks and Kilmer.

d. 42 degree Brix.

e. 43.4 degree Brix.

f. 42 degree Brix.

Table 14. Utilization of grapefruit by type of processed products, 1959-60 through 1983-84 seasons.

SEASON	Canned single- strength juice, sec. & sld	Canned s.s. juice, sec- tion & salads index	Frozen concentrate <sup>a</sup>	Frozen concentrate <sup>a</sup> index	Chilled juice, sections, and salads	Chilled juice, sections, & salads index	Total processed cost	Total processed index
	1000 boxes	Percent	1000 boxes	Percent	1000 boxes	Percent	1000 boxes	Percent
1959-60	11494	80.8	1613	11.3	1119	7.9	14226	100
1960-61	11046	69.7	3603	22.7	1195	7.5	15844	100
1961-62	12385	74.8	2773	16.7	1402	8.5	16560	100
1962-63	11439	71.7	3260	20.4	1258	7.9	15957	100
1963-64	7387	63.8	2407	20.8	1784	15.4	11578	100
1964-65	10937	68.7	3551	22.3	1441	9.0	15929	100
1965-66	13242	67.5	4010	20.4	2363	12.0	19615	100
1966-67	18105	69.0	5405	20.6	2736	10.4	26246	100
1967-68	13411	74.1	1793	9.9	2954	16.0	18108	100
1968-69	15940	61.8	6550	25.4	3307	12.8	25797	100
1969-70	15604	67.4	4579	19.8	2983	12.9	23166	100
1970-71	14679	63.3	6819	24.4	3439	12.3	27937	100
1971-72	14121	57.0	8725	29.0	4201	14.0	30047	100
1972-73	16034	56.5	8212	29.0	4119	14.5	28365	100
1973-74	16794	57.2	8732	29.7	3843	13.1	29369	100
1974-75	13664	53.1	7779	30.2	4305	16.7	25748	100
1975-76	14410	50.8	8987	31.7	4974	17.5	28371	100
1976-77	16217	47.0	13020	37.7	5265	15.3	34502	100
1977-78	14173	42.4	13999	41.8	5293	15.8	33465	100
1978-79	13037	43.1	13276	43.9	3933	13.0	30246	100
1979-80	12461	35.2	18506	52.3	4393	12.4	35360	100
1980-81	10140	30.6	19490	58.8	3489	10.5	33119	100
1981-82	8955	28.6	20052	64.0	2326	7.4	31333	100
1982-83	5291	25.2	13977	66.6	1731	8.2	20999	100
1983-84	3251	14.0	18728	80.4	1320	5.7	23299	100

Source: Florida Citrus Mutual.

a. Includes grapefruit used in blended concentrates and processed hot pack concentrate grapefruit juice.

Table 15. Costs of processing, warehousing and selling Florida unsweetened grapefruit juice in 12 46-ounce cans of juice in cases, 1959-60 through 1982-83 seasons.

	Materials		Process-		Other		Warehou-		Selling,		Total	
	cost	index <sup>b</sup>	ing labor cost	ing labor index <sup>b</sup>	processing expenses	processing expenses <sup>a</sup> index <sup>b</sup>	sing cost	ing index <sup>b</sup>	adminis- trative & other expenses	adminis- trative & other index <sup>b</sup>	processing cost	processing index <sup>b</sup>
	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent
SEASON												
1959-60	1.0348	98	0.1449	111	0.1355	97	0.0283	40	0.1596	76	1.5031	93
1960-61	1.0616	100	0.1447	111	0.1378	98	0.0375	54	0.1854	88	1.5670	97
1961-62	1.0623	100	0.0895	69	0.1167	83	0.0837	120	0.1917	91	1.5439	96
1962-63	1.0726	101	0.1174	90	0.1505	107	0.1054	151	0.2752	131	1.7211	107
1963-64	1.0678	101	0.1298	100	0.1676	120	0.0942	135	0.2621	125	1.7215	107
1964-65	1.0849	102	0.1120	86	0.1218	87	0.0809	116	0.2220	106	1.6216	101
1965-66	1.1175	105	0.1210	93	0.1312	94	0.0947	135	0.2385	114	1.7029	106
1966-67	1.1241	106	0.1304	100	0.1164	83	0.0929	133	0.2133	102	1.6771	104
1967-68	1.1537	109	0.1688	130	0.1588	113	0.1245	178	0.2729	130	1.8787	117
1968-69	1.1971	113	0.1745	134	0.1497	107	0.1109	158	0.2320	110	1.8642	116
1969-70	1.1882	112	0.2101	162	0.1752	125	0.1133	162	0.2977	142	1.9845	123
1970-71	1.1780	111	0.2081	160	0.1983	142	0.1337	191	0.3412	162	2.0593	128
1971-72	1.2005	113	0.2004	154	0.2007	143	0.1352	193	0.3217	153	2.0585	128
1972-73	1.2583	119	0.2104	162	0.2157	154	0.1756	251	0.2956	141	2.1556	134
1973-74	1.3664	129	0.1856	143	0.2273	162	0.2321	332	0.3813	182	2.3927	149
1974-75	1.8672	176	0.1920	148	0.2336	167	0.2293	328	0.3470	165	2.8691	178
1975-76	1.7765	168	0.1985	153	0.3062	219	0.1797	257	0.3639	173	2.8248	175
1976-77	1.7825	168	0.2501	192	0.3143	224	0.2007	287	0.3715	177	2.9191	181
1977-78	1.9602	185	0.2721	209	0.3186	228	0.2011	287	0.3978	189	3.1498	196
1978-79	2.2258	210	0.2805	216	0.3699	264	0.2014	288	0.4115	196	3.4891	217
1979-80	2.5544	241	0.3146	242	0.4229	302	0.2109	301	0.4891	233	3.9919	248
1980-81	2.7781	262	0.3887	299	0.5884	420	0.2746	392	0.7239	345	4.7537	295
1981-82	2.9573	279	0.3803	293	0.5159	368	0.2790	399	0.7531	359	4.8856	303
1982-83	2.9061	274	0.3890	299	0.6404	457	0.2546	364	0.7444	354	4.9345	306

Source: Hooks; Hooks and Killmer.

a. Includes utilities, maintenance and repairs, depreciation, rent, taxes, insurance, and miscellaneous other expenses.

b. Percent of average value for 1959-60 through 1963-64 seasons (Index).

83 whereas materials represents 58.9 percent and increased 174 percent.

#### WHOLESALE AND RETAILING COSTS

In order to complete the marketing channel, transportation, wholesaling and retailing costs in addition to F.O.B. shipping point and retail prices need to be available. Unfortunately, few of the data needed to examine the components of the F.O.B.-retail margin are available for specific products. However, the F.O.B.-retail price differential can be examined to determine the nature of changes in the relationship for several seasons for fresh grapefruit, frozen concentrated orange juice, and canned single strength grapefruit juice. Even then, data on F.O.B. prices are not perfect because sales at prices that deviate from card or posted prices are generally not publicized nor reported. In addition, F.O.B. prices for advertised branded products were not available.

It must be emphasized that only relative changes in the marketing margin can be measured and that little can be said about wholesale or retail profit levels. In addition, because of the nature of a retail outlet, it is possible that a retailer may have very low or negative margins on certain products in order to generate traffic through the store and sell products with higher unit profits. The extent to which citrus and citrus products are used as loss leaders is not known.

The F.O.B.-retail margin accounts for over 60 percent of the retail value of fresh fruit (Table 16). Less Than 40 percent of the retail price paid for fresh Florida grapefruit is paid for growing, picking and hauling, and packing and selling. On the other hand, the F.O.B.-retail margins for frozen concentrated orange juice and canned single strength grapefruit juice average 25 and 27 percent of retail value (Tables 17 and 18). No trend in the F.O.B.-retail margin is evident except for FCOJ where the trend is downward (Table 17).

#### **COSTS OF MARKETING CHANNEL FUNCTIONS**

While previous sections have been concerned with stages in the marketing channel, the purpose of this section is to look simultaneously at the total marketing channel and determine how much of the consumer's dollar spent on citrus and citrus products is returned to various marketing channel participants. Three products, orange concentrate, canned single strength grapefruit juice and fresh grapefruit are examined.

The amount and percentage of the retail dollar that is returned at various levels in the marketing channel is calculated for frozen concentrated orange juice (Table 17). The processing cost share has the lowest coefficient of variation<sup>1</sup> (12.21 percent). The coefficient

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<sup>1</sup>The coefficient of variation is defined as the standard deviation divided by the average times 100. It is a relative measure of the variability of a series of numbers.

Table 16. Proportion of the consumer's retail food dollar spent on fresh grapefruit that is returned to various marketing channel participants, 1964-65 through 1983-84 seasons.

SEASON	Retail value <sup>ab</sup>		F.O.B.-retail margin <sup>c</sup>		Packing cost <sup>de</sup>		Picking and hauling cost <sup>df</sup>		On-tree value plus marketing firm profit <sup>gh</sup>		On-tree value + mktg. firm profits share	
	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent
1964-65	10.57	100	6.53	62	1.37	13	0.45	4	2.22	21		
1965-66	10.00	100	5.77	58	1.41	14	0.50	5	2.32	23		
1966-67	9.33	100	5.96	64	1.41	15	0.48	5	1.48	16		
1967-68	10.85	100	5.85	54	1.56	14	0.55	5	2.89	27		
1968-69	11.03	100	7.18	65	1.57	14	0.55	5	1.73	16		
1969-70	11.48	100	7.05	61	1.66	14	0.60	5	2.17	19		
1970-71	11.22	100	6.66	59	1.71	15	0.62	6	2.23	20		
1971-72	12.54	100	7.23	58	1.72	14	0.66	5	2.93	23		
1972-73	13.47	100	7.99	59	1.77	13	0.74	5	2.97	22		
1973-74	13.97	100	8.85	63	2.06	15	0.85	6	2.21	16		
1974-75	15.02	100	9.41	63	2.21	15	0.83	6	2.57	17		
1975-76	14.48	100	9.22	64	2.27	16	0.85	6	2.14	15		
1976-77	15.76	100	10.14	64	2.55	16	0.91	6	2.16	14		
1977-78	16.58 <sup>i</sup>	100	11.12	67	2.43	15	0.82	5	2.21	13		
1978-79	19.50 <sup>i</sup>	100	12.56	64	2.62	13	0.90	5	3.42	18		
1979-80	19.91 <sup>i</sup>	100	11.86	60	2.89	15	1.15	6	4.01	20		
1980-81	22.18 <sup>i</sup>	100	13.17	59	3.57	16	1.27	6	4.17	19		
1981-82	24.00 <sup>i</sup>	100	15.97	67	3.57	15	1.28	5	3.18	13		
1982-83	24.69 <sup>i</sup>	100	16.92	69	.	.	1.27	5	.	.		
1983-84	24.60 <sup>i</sup>	100	16.46	67	.	.	.	.	.	.		

a. Source: Unpublished USDA data

b. Six-month weighted average (November-April), white seedless, size 40 packed in two 4/5-bushel cartons, average for Atlanta, Boston, Chicago, and Pittsburg.

c. Calculated using the Citrus Administrative Committee and Florida Citrus Mutual.

d. Costs do not include profits.

e. Source: Table 10.

f. Source: Table 7.

g. This value includes pick and haul and packinghouse firm profits.

h. Calculated: On-tree equals retail value minus F.O.B.-retail margin minus packing cost minus picking and hauling cost.

i. Six-month weighted average (November-April), white seedless, in two 4/5 bushel cartons, average for Baltimore and Boston.

Table 17. Proportion of the consumer's retail food dollar spent on six-ounce cans of frozen concentrated orange juice that is returned to various marketing channel participants, 1964-65 through 1983-84 seasons.

SEASON	Retail value <sup>a</sup>		F.O.B.-retail margin <sup>b</sup>		Process- ing cost <sup>cd</sup>		Picking and hauling cost <sup>ce</sup>		On-tree value plus firm profit <sup>fg</sup>	
	\$/doz.	Percent	\$/doz.	Percent	\$/doz.	Percent	\$/doz.	Percent	\$/doz.	Percent
1964-65	2.32	100	0.70	30	0.54	23	0.19	8	0.89	38
1965-66	2.20	100	0.58	26	0.59	27	0.26	12	0.77	35
1966-67	1.75	100	0.56	32	0.52	30	0.24	14	0.43	25
1967-68	2.11	100	0.48	23	0.56	27	0.28	13	0.79	37
1968-69	2.41	100	0.63	26	0.56	23	0.35	15	0.87	36
1969-70	2.21	100	0.74	33	0.60	27	0.34	15	0.53	24
1970-71	2.23	100	0.63	28	0.61	27	0.36	16	0.63	28
1971-72	2.46	100	0.58	24	0.60	24	0.37	15	0.91	37
1972-73	2.39	100	0.66	28	0.67	28	0.41	17	0.88	37
1973-74	2.14	100	0.61	28	0.76	31	0.46	19	0.61	28
1974-75	2.61	100	0.58	22	0.60	23	0.43	16	1.03	39
1975-76	2.64	100	0.61	23	0.81	31	0.44	17	0.78	30
1976-77	3.20	100	0.64	20	0.87	27	0.58	18	1.11	35
1977-78	4.29	100	0.96	22	0.91	21	0.56	13	1.86	43
1978-79	4.59	100	1.09	24	0.94	20	0.59	13	1.97	43
1979-80	4.14	100	1.04	25	0.98	24	0.61	15	1.51	36
1980-81	5.10	100	1.22	24	1.19	23	0.73	14	1.96	38
1981-82	5.26	100	1.31	25	1.23	23	0.73	14	1.99	38
1982-83	5.12	100	1.19	23	1.19	23	0.60	12	2.14	42
1983-84	5.82	100	0.98	17						

- a. Source: Ward and Kilmer, Table 2.16.
- b. Calculated from Ward and Kilmer, Table 2.16, and Brooks.
- c. Costs do not include profits.
- d. Calculated from Table 12.
- e. Calculated from Table 6 and Florida Citrus Mutual.
- f. This value includes pick and haul and processing firm profits.
- g. Calculated: On-tree equals retail value minus F.O.B.-retail margin minus processing cost minus picking and hauling cost.

Table 18. Proportion of the consumer's retail food dollar spent on 12 46-ounce cans of single strength grapefruit juice that is returned to various marketing channel participants, 1964-65 through 1983-84 seasons.

SEASON	Retail value <sup>a</sup>		F.O.B.- retail margin <sup>b</sup>		Process- ing cost <sup>c,d</sup>		Picking and hauling cost <sup>e</sup>		On-tree value plus marketing firm profit <sup>f,g</sup>		On-tree value + mktg. firm profits share	
	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent
1964-65	4.43	100	1.27	29	1.62	37	0.42	9	1.12	25		
1965-66	4.67	100	1.38	30	1.70	36	0.49	10	1.10	24		
1966-67	4.03	100	1.34	33	1.68	42	0.46	11	0.55	14		
1967-68	4.71	100	1.20	25	1.88	40	0.53	11	1.10	23		
1968-69	4.50	100	1.43	32	1.86	41	0.55	12	0.66	15		
1969-70	5.42	100	1.36	25	1.98	37	0.58	11	1.50	28		
1970-71	5.74	100	1.34	23	2.06	36	0.59	10	1.75	30		
1971-72	5.81	100	1.33	23	2.06	35	0.60	10	1.82	31		
1972-73	5.60	100	1.48	26	2.16	39	0.68	12	1.28	23		
1973-74	5.59	100	1.43	25	2.52	45	0.78	14	0.89	16		
1974-75	5.91	100	1.57	27	2.87	49	0.78	13	0.69	12		
1975-76	5.90	100	1.51	26	2.82	48	0.78	13	0.79	13		
1976-77	6.52	100	1.51	23	2.92	45	0.96	15	1.13	17		
1977-78	6.78	100	1.73	26	3.15	46	0.98	14	0.92	14		
1978-79	7.62	100	1.58	21	3.49	46	1.02	13	1.52	20		
1979-80	9.44	100	2.34	25	3.99	42	1.05	11	2.06	22		
1980-81	10.88	100	2.81	26	4.75	44	1.22	11	2.10	19		
1981-82	9.95	100	3.45	35	4.89	49	1.12	11	0.49	5		
1982-83	9.41	100	3.21	34	4.93	52	1.09	12	0.18	2		
1983-84	11.45	100	3.30	29								

a. Source: Citrus Digest.

b. Calculated from Brooks.

c. Costs do not include profits.

d. Source: Table 15.

e. Calculated from Table 7; Brooks; and Florida Citrus Mutual.

f. This value includes pick and haul and processing firm profits.

g. Calculated: On-tree equals retail value minus F.O.B.-retail margin minus processing cost minus picking and hauling cost.



of variation for the F.O.B.-retail margin share, the picking and hauling cost share, and on-tree value plus marketing firm profits share is 15.62, 17.29, and 18.01 percent, indicating an increase in variability.

For the 19 years shown, on-tree returns averaged 35 percent of the retail price paid for orange concentrate in six ounce cans. The F.O.B.-retail and processing cost have both averaged 25 percent. Picking and hauling costs have accounted for the lowest percentage of the retail dollar (15 percent).

For canned grapefruit juice the relative proportion of the retail dollar to processing costs is higher than for concentrate (43 compared to 25 percent) (Tables 17 and 18). Picking and hauling costs represent a lower percentage of the retail dollar (12 percent) while on-tree value plus marketing firm profits are 19 percent and have the highest coefficient of variation (42.5 percent). The F.O.B.-retail margin is approximately 27 percent of the retail dollar and shows a higher coefficient of variation than processing costs (14.41 percent compared to 12.04 percent).

The F.O.B.-retail margin for fresh grapefruit accounted for 62 percent of the retail food dollar for the past 20 seasons (Table 16). For every dollar a consumer has spent on fresh grapefruit, \$.62 pays for services that occur after it leaves Florida packinghouses. Picking, hauling, packing, and selling expenses account for \$.20 and on-tree value plus marketing firm profits are \$.18. On-tree returns displayed the highest coefficient of variation at 20.94 percent while the F.O.B.-retail margin share, the packing cost share, and the pick-

ing and hauling cost share had coefficients of 6.05, 6.25, and 8.49 percent which shows a lower variability than on-tree returns.

## REFERENCES

- Brooks, Thurston. 1985. Citrus Reference, Economic Research Department of Florida Department of Citrus, University of Florida, Gainesville (June).
- Citrus Digest. Lakeland: Florida Department of Citrus. Various issues.
- Florida Agricultural Statistics, Citrus Summary, Florida Crop and Livestock Reporting Service, Orlando, Florida. Various years.
- Florida Canner's Association, Statistical Summary, Winter Haven, Florida. Various years.
- Florida Citrus Mutual, Annual Statistical Report, Winter Haven, Florida. Various years.
- Florida Crop and Livestock Reporting Service. 1985. Citrus, Orlando, Florida.
- Florida Division of Fruit and Vegetable Inspection, Annual Report. Various years.
- Growers Administrative Committee, Annual Statistical Record, Lakeland, Florida. Various issues.
- Hooks, R. Clegg. Estimated Costs of Packing and Selling Fresh Florida Citrus, Economic Information Report. Food and Resource Economics Department, University of Florida, Gainesville. Various years.
- Hooks, R. Clegg. Estimated Costs of Processing, Warehousing, and Selling Florida Citrus Products, Economic Information Report. Food and Resource Economics Department, University of Florida, Gainesville. Various years.
- Hooks, R. Clegg. Estimated Costs of Picking and Hauling Florida Citrus Fruits, Economic Information Report. Food and Resource Economics Department, University of Florida, Gainesville. Various years.
- Hooks, R. Clegg and Richard L. Kilmer, Estimated Costs of Packing and Selling Fresh Florida Citrus, Economic Information Report. Food and Resource Economics Department, University of Florida, Gainesville. Various years.

- Hooks, R. Clegg and Richard L. Kilmer, Estimated Costs of Processing, Warehousing, and Selling Florida Citrus Products, Economic Information Report. Food and Resource Economics Department, University of Florida, Gainesville. Various years.
- Hooks, R. Clegg and Richard L. Kilmer, Estimated Costs of Picking and Hauling Florida Citrus Fruits, Economic Information Report. Food and Resource Economics Department, University of Florida, Gainesville. Various years.
- Kilmer, Richard L. 1982. Grower's Returns and Marketing Costs for Florida Citrus, Economic Information Report 167. Food and Resource Economics Department, University of Florida, Gainesville (September).
- United States Department of Agriculture. 1985. 1985 Agricultural Chartbook. USDA Agriculture Handbook No. 652.
- Ward, Ronald W. and Richard L. Kilmer. 1980. The United States Citrus Subsector: Organization, Behavior, and Performance, North Central Regional Publication No. 203, Monograph No. 8, Gainesville (December).

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