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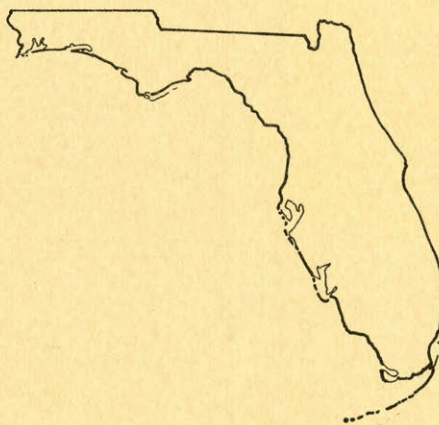
Richard L. Kilmer

Economic Information
Report 167

Grower's 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 nearly 61 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 27 and 26 percent, respectively, of the consumers' expenditures.

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

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GROWERS' RETURNS AND MARKETING COSTS
FOR FLORIDA CITRUS

Richard L. Kilmer

INTRODUCTION

The United States Department of Agriculture has published the farmer's share of the consumer's food dollar on commodities for many years. The increase in food prices has stimulated an interest in cost of marketing functions performed between the producer and consumer. The purpose of this update of a previous report [12] is to look at the costs associated with each level in the fresh and processed citrus marketing channel. In this paper (1) 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 are examined.

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

Total citrus bearing acreage in Florida declined from 1970-71 through 1978-79 and then increased (Table 1). The increase came from increases in orange bearing acreage which were complemented by increases in grapefruit bearing acreage which has continued since 1963-64. Specialty fruit acreage has declined since 1970-71 but was offset by the increases in orange and grapefruit bearing acreage. Prior to 1970-71, orange and specialty fruit bearing acreage had increased rapidly while grapefruit bearing acreage had remained relatively stable. In 1980-81, orange, grapefruit,

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Table 1. Florida citrus bearing acres by type of fruit, 1959-60 through 1980-81 seasons.

Season	<u>All round oranges</u>		<u>All grapefruit</u>		<u>Specialty fruit^a</u>		<u>All citrus</u>	
	<u>Bearing Acreage</u>	<u>Index^b</u>	<u>Bearing Acreage</u>	<u>Index^b</u>	<u>Bearing Acreage</u>	<u>Index^b</u>	<u>Bearing Acreage</u>	<u>Index^b</u>
	<u>1000 acres</u>	<u>Percent</u>	<u>1000 acres</u>	<u>Percent</u>	<u>1000 acres</u>	<u>Percent</u>	<u>1000 acres</u>	<u>Percent</u>
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	46.8	106	549.5	106
1962-63	370.0	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	93	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	71.6	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	128	73.7	166	799.5	155
1975-76	596.4	156	117.9	131	70.2	159	784.5	152
1976-77	594.3	156	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	63.0	142	762.0	148
Index	382.16		89.6		44.28		516.4	

Source: [1]

^aIncludes Temples, tangelos, tangerines, honey tangerines and limes.

^bPercentage of average value for 1959-60 through 1963-64 seasons (Index).

and specialty fruit accounted for 75, 17, and 8 percent of total citrus bearing acreage.

Even though total citrus bearing acreage has stabilized during the last four years instead of declining, total citrus production has declined except for 1979-80 (Table 2). This is due to the freeze in 1976-77 which had carry over effects into the next two years and to a second freeze in 1980-81. This decline in production is atypical when compared to the 1970-71 through 1976-77 period when total citrus acreage decreased while total production increased.

The total nominal on-tree value of the citrus crop more than doubled from 1975-76 to the 1978-79 season (Table 3). Oranges showed the largest increase with specialty fruit second. By the 1980-81 season, however, grapefruit value had increased more than 300 percentage points.

Between 1976-77 and 1980-81, per acre nominal returns more than doubled for the total citrus crop and oranges and grapefruit in particular (Table 4). This was also the case for on-tree nominal returns per box (Table 5).

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. Recent increases in harvesting and hauling costs--especially labor costs--have been of great concern to the industry. While mechanical harvesting may, in the future, work to deter the rapidly increasing harvesting costs, mechanical harvesting adoption has been slow. Harvesting and hauling costs remain a major concern.

Table 2. Florida citrus production by type of fruit, 1959-60 through 1980-81 seasons.

Season	<u>All round oranges</u>		<u>All grapefruit</u>		<u>Specialty fruit^a</u>		<u>All citrus</u>	
	Production	Index ^b	Production	Index ^b	Production	Index ^b	Production	Index ^b
	1000 1-3/5 boxes	Percent	1000 1-3/5 boxes	Percent	1000 1-3/5 boxes	Percent	1000 1-3/5 boxes	Percent
1959-60	87,600	108	30,500	100	7,470	90	125,570	104
1960-61	82,700	102	31,600	103	9,980	120	124,280	103
1961-62	108,800	134	34,800	114	10,210	123	153,810	128
1962-63	72,500	89	30,000	98	5,250	63	107,750	90
1963-64	54,900	68	26,300	86	8,620	104	89,820	75
1964-65	82,400	101	31,900	104	9,350	113	123,650	103
1965-66	95,900	118	34,900	114	10,190	123	140,990	117
1966-67	139,500	172	43,600	142	11,895	143	194,995	162
1967-68	100,500	124	32,900	107	10,270	124	143,670	119
1968-69	129,700	160	39,900	130	11,500	138	181,100	151
1969-70	137,700	169	37,400	122	12,405	149	187,505	156
1970-71	142,300	175	42,900	140	13,250	160	198,450	165
1971-72	137,000	169	47,000	153	14,800	178	198,800	165
1972-73	169,700	209	45,400	148	13,200	159	228,300	190
1973-74	165,800	204	48,100	157	14,350	173	228,250	190
1974-75	173,300	213	44,600	146	15,850	191	233,750	194
1975-76	181,200	223	49,100	160	17,530	211	247,830	206
1976-77	186,800	230	51,500	168	14,250	172	252,550	210
1977-78	167,800	206	51,400	168	12,450	150	231,650	193
1978-79	164,000	202	50,000	163	14,890	179	228,890	190
1979-80	206,700	254	54,800	179	20,200	243	281,700	234
1980-81	172,400	212	50,300	164	13,800	166	236,500	197
Index	81,300		30,640		8,306		120,246	

Source: [1]

^aIncludes Temples, tangelos, tangerines, honey tangerines and limes.

^bPercentage of average value for 1959-60 through 1964-64 seasons (Index).

Table 3. On-tree value of Florida citrus production by type of fruit, 1959-60 through 1980-81 seasons.

Season	All round oranges		All grapefruit		Specialty fruit ^a		All citrus ^b	
	Value	Index ^c	Value	Index ^c	Value	Index ^c	Value	Index ^c
	Thousand \$	Percent	Thousand \$	Percent	Thousand \$	Percent	Thousand \$	Percent
1959-60	170,057	80	32,043	88	19,635	82	221,735	82
1960-61	244,376	116	30,138	83	25,348	106	299,862	110
1961-62	203,255	96	23,498	65	23,506	98	250,259	92
1962-63	196,116	93	37,146	102	17,421	73	250,683	92
1963-64	243,935	115	59,147	163	34,005	142	337,087	124
1964-65	200,276	95	46,892	129	27,308	114	274,476	101
1965-66	155,625	74	47,471	130	22,312	93	225,408	83
1966-67	130,526	62	32,393	89	15,156	63	178,075	65
1967-68	207,432	98	66,317	182	34,321	143	308,070	113
1968-69	218,660	103	39,011	107	27,723	116	285,394	105
1969-70	156,876	74	63,526	175	22,055	92	242,457	89
1970-71	208,146	98	81,514	224	24,228	101	313,888	115
1971-72	280,317	133	108,991	299	33,991	142	423,299	156
1972-73	265,361	125	94,635	260	29,434	123	389,430	143
1973-74	244,691	116	79,879	219	30,692	128	355,262	131
1974-75	280,350	133	76,367	210	36,498	152	393,215	145
1975-76	321,449	152	72,155	198	42,552	177	436,156	160
1976-77	405,982	192	81,116	223	38,810	162	525,908	193
1977-78	693,677	328	84,438	232	68,219	284	846,334	311
1978-79	764,961	362	120,128	330	77,481	323	962,570	354
1979-80	768,877	363	181,208	498	76,639	320	1,026,724	378
1980-81	770,109	364	183,376	504	57,891	241	1,011,376	372
Index	211,548		36,395		23,983		271,925	

Source: [1]

^aIncludes temples, tangelos, tangerines, honey tangerines and limes.

^bIncludes all round oranges, all grapefruit, and specialty fruit.

^cPercentage 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 1980-81 seasons.

Season	All round oranges		All grapefruit		Speciality fruit ^a		All citrus	
	Value	Index ^b	Value	Index ^b	Value	Index ^b	Value	Index ^b
	\$/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	606.15	110	555.97	105
1976-77	683.13	123	679.93	165	557.61	102	671.49	127
1977-78	1,198.06	216	701.90	171	1,041.51	190	1,106.61	210
1978-79	1,338.51	242	964.11	234	1,222.10	223	1,267.37	240
1979-80	1,333.47	241	1,433.61	348	1,205.02	220	1,339.32	254
1980-81	1,343.06	243	1,460.00	355	918.90	167	1,327.27	252
Index	553.78		411.54		548.84		527.40	

Source: [1]

^aIncludes Temples, tangelos, tangerines, honey tangerines and limes.

^bPercentage of average value 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 1980-81 seasons.

Season	All round oranges		All grapefruit		Specialty fruit ^a		All citrus	
	Price	Index ^b	Price	Index ^b	Price	Index ^b	Price	Index ^b
	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent
1959-60	1.96	70	1.05	122	2.62	89	1.76	74
1960-61	2.98	107	.96	78	2.53	86	2.41	101
1961-62	1.88	67	.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	.94	34	.74	60	1.27	43	.91	38
1967-68	2.07	74	2.01	163	3.34	114	2.14	90
1968-69	1.68	60	.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	4.46	160	3.65	297	4.19	143	4.28	180
Index	2.79		1.23		2.94		2.38	

Source: [1]

^aIncludes Temples, tangelos, tangerines, honey tangerines and limes.

^bPercentage of average value for 1959-60 through 1963-64 seasons (Index).

Orange harvesting and hauling costs in 1979-80 are estimated to have increased to 196 percent (1959-60 through 1963-64 as base years) while grapefruit and tangerine picking and hauling costs are estimated to have increased to 137 and 113 percent (Table 6, 7, 8). Of the items that make up total picking and hauling costs for oranges, picking labor is the item accounting for the largest proportion of the total. Accounting for 47 percent of the total, it increased steadily from 1959-60 through 1973-74 and then declined slightly and started increasing again in 1976-77. Other labor, however, has increased and continues to increase. Finally, fuel, maintenance, and depreciation have increased significantly since 1968-69.

The relatively slow increase in picking labor costs for tangerines (Table 8) reflects a change in the picking method. Clipping involves manually handling each piece of fruit and using a shear to remove each fruit from the tree. Because clipping tangerines reduces a picker's capacity, pickers generally require a higher per box wage when clipping is required. As the proportion of tangerines pulled rather than clipped has increased, the cost of picking tangerines has decreased relative to the cost of picking oranges and grapefruit.

In addition to the type of fruit and grove conditions, several other economic factors have been found to be related to the piece rate for citrus pickers. Walker [14] has shown that the most important determinants of the piece rate for citrus pickers are the nonfarm wage rate and the unemployment rate. The results indicate that the piece rate and the nonfarm wage rate in food and kindered industries in Florida are positively related and that the piece rate and the Florida unemployment rate are negatively related.

Table 6. Picking and hauling costs and indices for Florida oranges, 1959-60 through 1979-80 seasons.

Season	Oranges									
	Labor				Fuel, maintenance depreciation		Administrative & b		Total	
	Pickers		Other ^a		Cost	Index ^c	Other ^b		Cost	Index ^c
	Cost	Index ^c	Cost	Index ^c			Cost	Index ^c		
	¢/box	Percent	¢/box	Percent	¢/box	Percent	¢/box	Percent	¢/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	38.54	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	285	12.32	184	145.21	296
Index	20.81		12.55		8.93		6.71		49.00	

Source: [8, 12]

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

^b Insurance, taxes, licenses, supplies, equipment rental, migratory labor, misc.

^c Percentage 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 1979-80 seasons.

Season	Grapefruit									
	Labor				Fuel, maintenance depreciation		Administrative & other ^b		Total	
	Pickers		Other ^a		Cost	Index ^c	Cost	Index ^c	Cost	Index ^c
	Cost	Index ^c	Cost	Index ^c						
	¢/box	Percent	¢/box	Percent	¢/box	Percent	¢/box	Percent	¢/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	24.62	217	11.25	138	5.20	105	82.07	209
1978-79	44.41	300	28.28	250	12.74	156	5.20	105	90.63	231
1979-80	45.16	305	30.27	267	11.69	143	6.05	122	93.17	237
Index	14.80		11.33		8.17		4.97		39.27	

Source: [8, 12]

^aSupervisory, loaders, drivers, other labor, payroll taxes.

^bInsurance, taxes, licenses, supplies, equipment rental, migratory labor, misc.

^cPercentage of average value for 1959-60 through 1963-64 seasons (Index).

Table 8. Picking and hauling costs and indices for Florida tangerines, 1959-60 through 1979-80 seasons.

Season	Tangerines									
	Labor				Fuel, maintenance depreciation		Administrative & Other ^b		Total	
	Pickers		Other ^a		Cost	Index ^c	Cost	Index ^c	Cost	Index ^c
	Cost	Index ^c	Cost	Index ^c						
	¢/box	Percent	¢/box	Percent	¢/box	Percent	¢/box	Percent	¢/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	1114.44	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	2.03	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	50.55	261	13.74	142	11.30	119	185.65	184
1978-79	110.08	177	54.12	279	12.97	134	11.49	121	188.66	187
1979-80	130.85	210	54.75	283	16.93	175	12.68	133	215.21	213
Index	62.33		19.37		9.65		9.51		100.85	

Source: [8, 12]

^aSupervisory, loaders, drivers, other labor, payroll taxes.

^bInsurance, taxes, licenses, supplies, equipment rental, migratory labor, misc.

^cPercentage of average value for 1959-60 through 1963-64 seasons (Index).

FRESH PACKING AND SELLING COSTS

While over 97 percent of oranges, 66 percent of grapefruit and 33 percent of tangerines are generally used in processed citrus products (Figure 1), the total volume of Florida citrus packed for fresh shipment has increased every season between 1968-69 and 1976-77, a freeze year (Figure 2). Since then, total shipments have not returned to 1975-76 levels. For some growers, the fresh market is their primary market and packing cost is the second key cost element in the marketing channel that affects on-tree grower returns.

Packing Costs

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 corrugated carton. Total packing and selling costs for grapefruit and oranges have risen steadily since 1959-60 (Tables 9, 10). All expense categories have not risen by the same proportions. Direct operating expenses have increased more relative to the base period than any other category.

Labor costs have not increased as much as most other items. This may be attributed in part to increasing mechanization in the handling and packing operations. The shift to pallet box instead of field box receiving and dumping and increased use of mechanical packer aids are two changes that have helped temper the increase in labor costs.

Other factors that influence packing costs include packout percentage (Figure 3) and packinghouse size. Kilmer and Tilley estimate that a 10 percent increase in packout will decrease packing

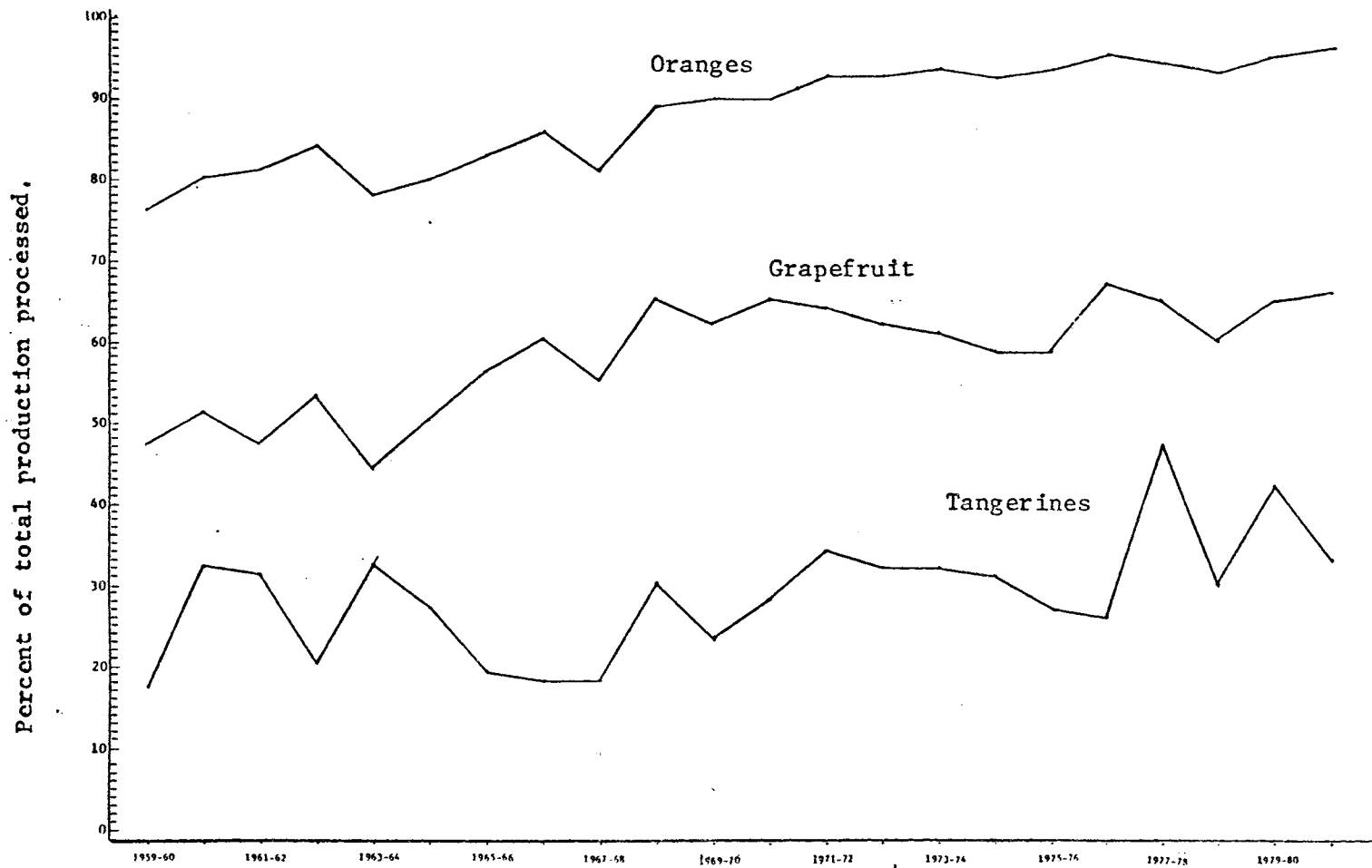


Figure 1. Utilization of Florida citrus from 1959-60 through 1980-81 seasons.

Source: [2]

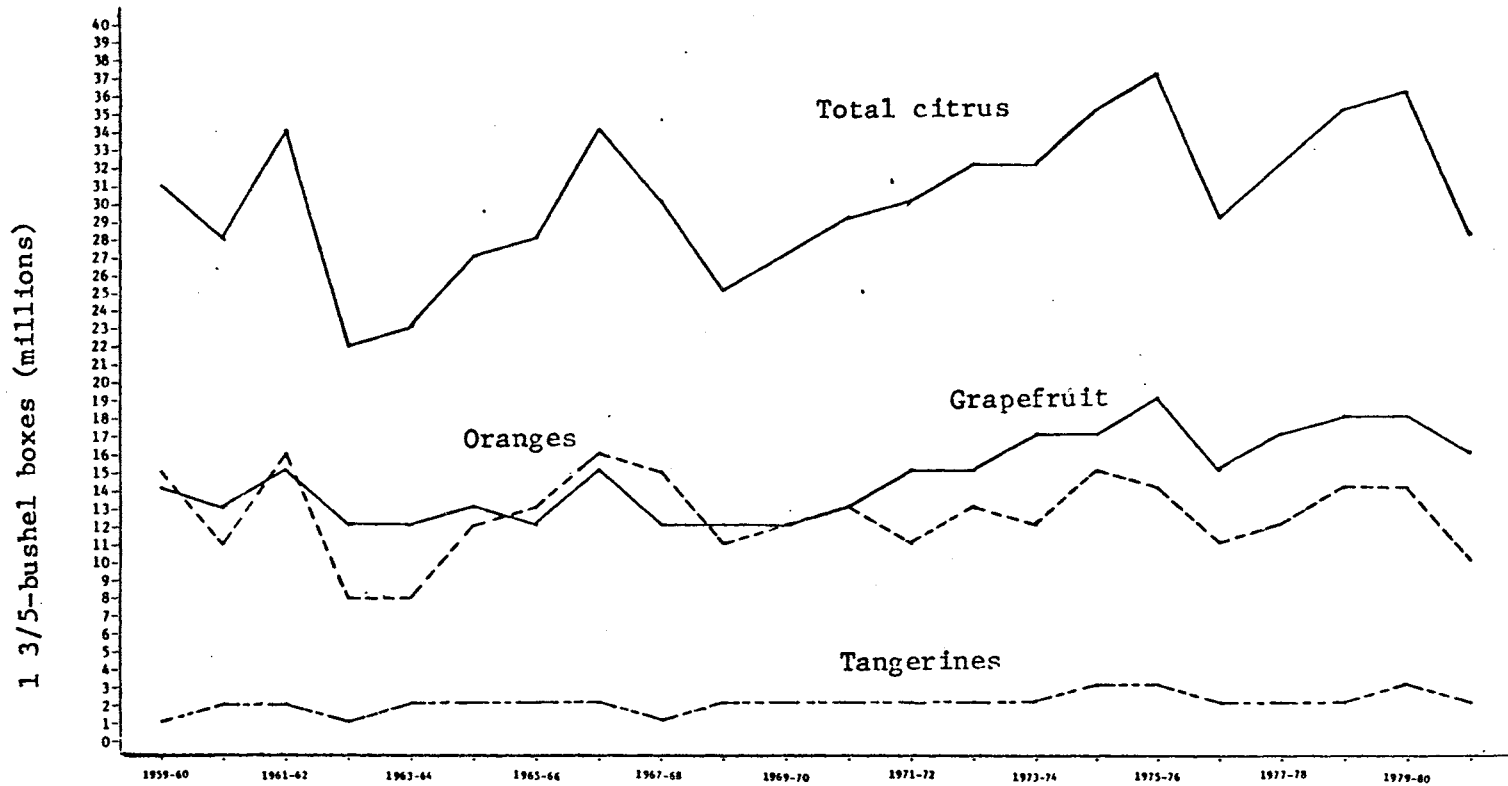


Figure 2. Certified fresh citrus fruit shipments from Florida 1959-60 through 1980-81.

Source: [4]

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 1979-80 seasons.

Year	Materials		Labor		Direct operating ^a		Indirect operating ^b		Selling administrative & other		Total packing & selling	
	Cost	Index ^c	Cost	Index ^c	Cost	Index ^c	Cost	Index ^c	Cost	Index ^c	Cost	Index ^c
	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent
1959-60	.4649	99	.3697	90	.0805	89	.0739	92	.2758	86	1.2648	92
1960-61	.4818	103	.3998	98	.0896	100	.0833	104	.2784	87	1.3329	97
1961-62	.4857	103	.4012	98	.0850	94	.0693	87	.2776	87	1.3188	96
1962-63	.4639	99	.4507	110	.1076	120	.0915	114	.3819	119	1.4956	109
1963-64	.4372	93	.4277	104	.0926	103	.0804	101	.3823	119	1.4202	104
1964-65	.4433	94	.4531	111	.0906	101	.0776	97	.3749	117	1.4395	105
1965-66	.4634	99	.4795	117	.0926	103	.0843	105	.3743	117	1.4941	109
1966-67	.4723	100	.4790	117	.0850	94	.0820	103	.3667	115	1.4850	108
1967-68	.4645	99	.5182	126	.1059	118	.0877	110	.3950	123	1.5713	115
1968-69	.4637	99	.5415	132	.1273	141	.1053	132	.3977	124	1.6355	119
1969-70	.4756	101	.4938	120	.1185	132	.1019	127	.4734	148	1.6632	121
1970-71	.4699	100	.5187	127	.1275	142	.1361	170	.4756	149	1.7278	126
1971-72	.4440	94	.5765	141	.1484	165	.1534	192	.4885	153	1.8108	132
1972-73	.4984	106	.6037	147	.1397	155	.1243	155	.4986	156	1.8647	136
1973-74	.5751	122	.6601	161	.1700	189	.1616	202	.5247	164	2.0915	153
1974-75	.6747	144	.6449	157	.1829	203	.1265	158	.5476	171	2.1766	159
1975-76	.7082	151	.6493	158	.1829	203	.1287	161	.5464	171	2.2155	162
1976-77	.7144	152	.7768	189	.2565	285	.1941	243	.6614	207	2.6032	190
1977-78	.6988	149	.7541	184	.2102	234	.1673	209	.6286	196	2.4590	179
1978-79	.7668	163	.8011	195	.2523	280	.1785	223	.6365	199	2.6352	192
1979-80	.8871	189	.9151	223	.2969	330	.1872	234	.6380	199	2.9243	213
Index	.47		.41		.09		.08		.32		1.37	

Source: [5, 12]

^aOther direct operating expenses include power, lights, water, repair, maintenance and other misc. supplies.

^bIndirect operating expenses include insurance, taxes, licenses, depreciation and rent.

^cPercent of average value for 1959-60 through 1963-64 seasons (Index).

Table 10. Cost components that make up the total cost of packing and selling 1-3/5 bushels of grapefruit in 4/5 bushel fiberboard cartons, 1959-60 through 1979-80 seasons.

Year	Materials		Labor		Direct operating ^a		Indirect operating ^b		Selling administrative & other		Total packing & selling	
	Cost	Index ^c	Cost	Index ^c	Cost	Index ^c	Cost	Index ^c	Cost	Index ^c	Cost	Index ^c
	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent
1959-60	.5979	115	.2914	86	.0581	97	.0405	81	.2763	92	1.2642	100
1960-61	.5193	100	.3020	89	.0608	101	.0430	86	.2791	93	1.2042	96
1961-62	.5242	101	.3492	103	.0594	99	.0545	109	.2946	98	1.2819	102
1962-63	.4818	93	.3621	107	.0723	121	.0551	110	.3144	105	1.2857	102
1963-64	.4534	87	.3733	110	.0646	108	.0607	121	.3337	111	1.2857	102
1964-65	.4721	91	.4038	119	.0772	129	.0663	133	.3519	117	1.3713	109
1965-66	.4835	93	.4229	124	.0753	126	.0675	135	.3628	121	1.4120	112
1966-67	.4952	95	.4192	123	.0666	111	.0668	134	.3651	122	1.4129	112
1967-68	.4918	95	.4862	143	.0919	153	.0850	170	.4009	134	1.5558	123
1968-69	.4752	91	.5085	150	.1029	172	.0974	195	.3849	128	1.5689	125
1969-70	.4756	91	.4938	145	.1185	198	.1019	204	.4734	158	1.6632	132
1970-71	.4864	94	.5055	149	.1196	199	.1083	217	.4914	164	1.7112	136
1971-72	.4718	91	.5270	155	.1217	203	.1017	203	.4965	166	1.7187	136
1972-73	.5150	99	.5147	151	.1193	199	.1068	214	.5181	173	1.7739	141
1973-74	.6017	116	.6210	183	.1430	238	.1484	297	.5471	182	2.0612	164
1974-75	.6903	133	.6347	187	.1954	326	.1346	269	.5520	184	2.2070	175
1975-76	.7517	145	.6175	182	.1752	292	.1403	281	.5864	195	2.2711	180
1976-77	.7592	146	.7286	214	.2232	372	.1613	323	.6814	227	2.5537	203
1977-78	.7001	135	.7457	219	.1979	330	.1454	291	.6435	215	2.4326	193
1978-79	.7988	154	.7771	229	.2166	361	.1446	289	.6864	229	2.6235	208
1979-80	.9175	176	.8375	246	.2500	417	.1477	295	.7388	246	2.8915	229
Index	.52		.34		.06		.05		.30		1.26	

Source: [5, 12]

^aPower, lights, water, supplies equipment.

^bInsurance, taxes, licenses, depreciation, rent.

^cPercentage of average value for 1959-60 through 1963-64 seasons (Index).

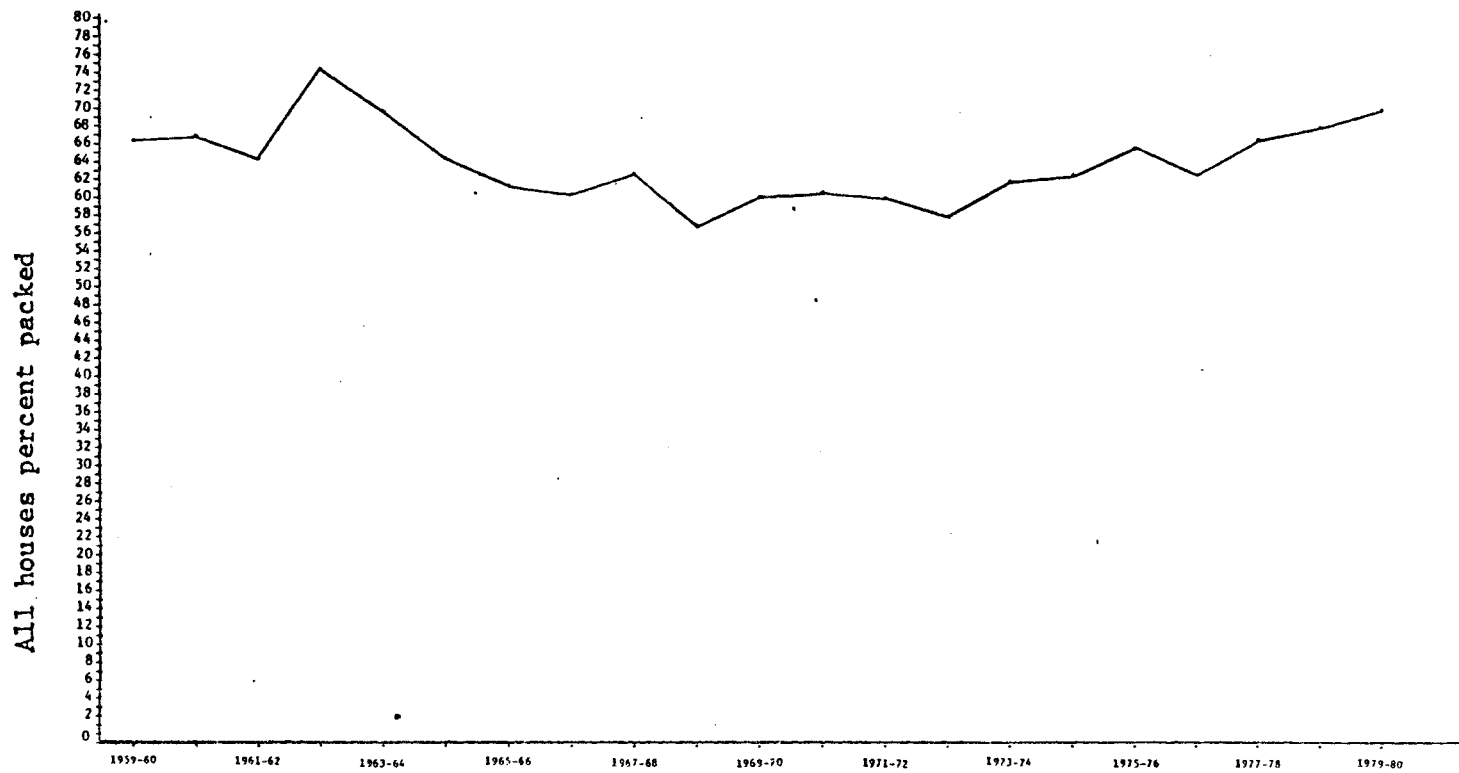


Figure 3. Proportion of Florida Citrus fruit delivered to packinghouses that is actually packed, 1959-60 through 1979-80 seasons,

Source: [5, 12]

costs about 3 cents per box. High (low) packout means that less (more) fruit must be handled in order to pack a given volume.

If low packout adversely affects the volume of fruit a packing-house packs in a given year, low packout may have a secondary impact on costs because of the decrease in volume. While the total volume of fruit handled has been increasing, the number of firms commercially packing fruit has decreased and the average volume per house has generally increased except for freeze years and the year following the freeze year (Figure 4).

PROCESSING, WAREHOUSING AND SELLING

Over 97 percent of oranges and 66 percent of grapefruit enter the processing channel (Figure 1). The processing channel is a multiple product channel in which frozen concentrate, chilled and canned products are produced. For each product there are a different set of factors that may influence costs. In order to simplify presentation, the major product for oranges and grapefruit will be used to illustrate the cost trends.

For oranges, frozen concentrate is the dominant product form (Table 11). For one case of 48 six-ounce cans, warehousing costs have shown the greatest variability and the greatest percentage increase (Table 12) of all processing, warehousing, and selling costs. Carryover has also increased and shown a great deal of variability since the 1959-60 season (Table 13). During the period, average warehousing costs increased from \$0.08 to \$0.23 per case of 48-six ounce cans, and ending inventory of concentrate increased from 9.7 million gallons to 66 million gallons. Both data series have shown great variability.

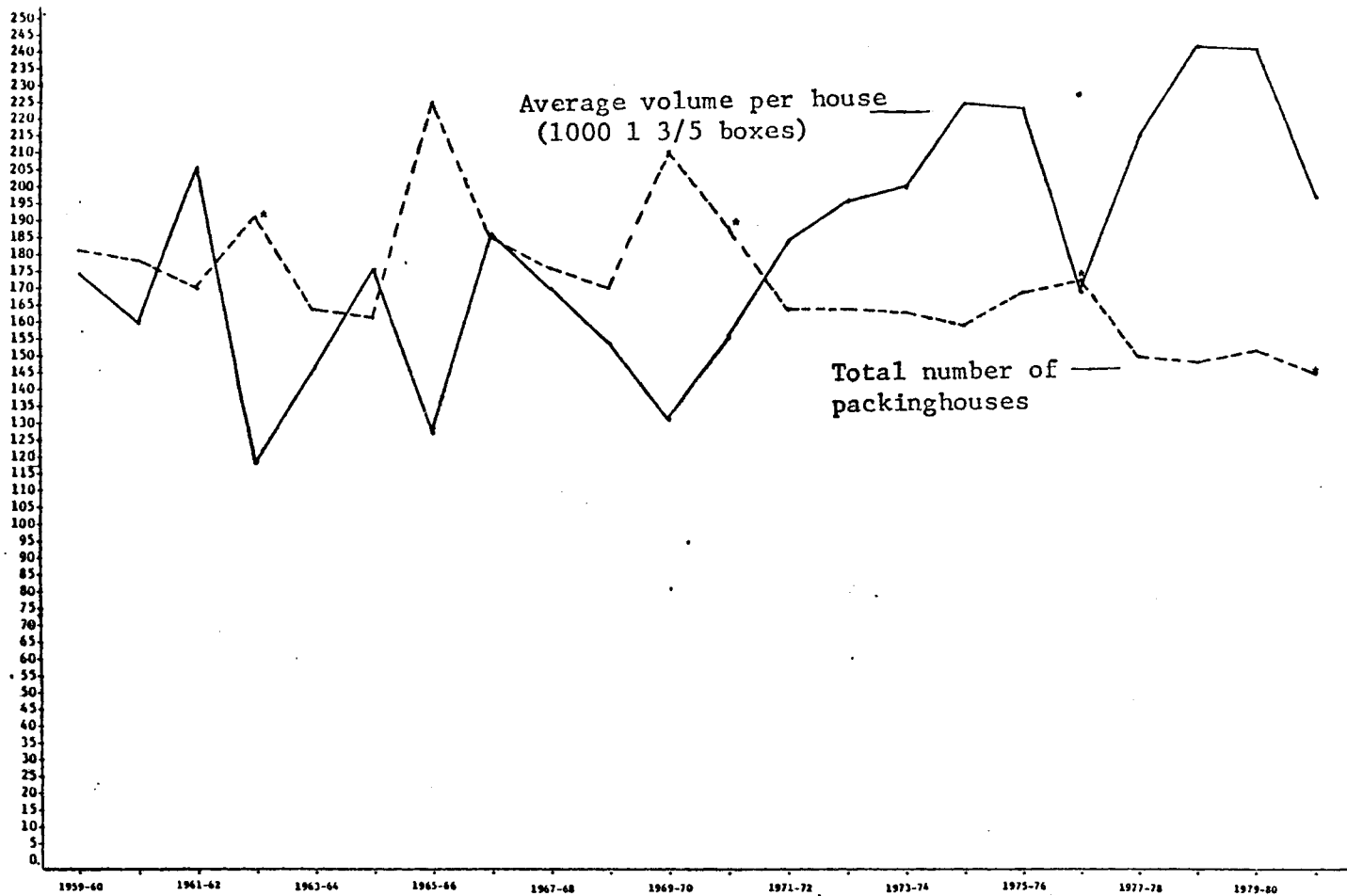


Figure 4. Certified fresh citrus shippers in Florida and average volume per packinghouse 1959-60 through 1980-81 seasons.

Source: [4]

Table 11. Utilization of oranges and Temples by type of processed products, 1959-60 through 1980-81 seasons.

Season	Canned single-strength juice, sections and salads		Frozen concentrate ^a		Chilled juice, sections and salads		Total Processed	
	Boxes used	Percent of total	Boxes used	Percent of total	Boxes used	Percent of total	Boxes used	Percent of total
	1000 boxes	Percent	1000 boxes	Percent	1000 boxes	Percent	1000 boxes	Percent
1959-60	10,231	14.6	51,957	74.3	7,769	11.1	69,957	100
1960-61	7,309	10.5	56,039	80.5	6,297	9.0	69,645	100
1961-62	9,673	10.6	73,986	80.7	7,970	8.7	91,629	100
1962-63	9,084	14.6	47,176	75.7	6,066	9.7	62,326	100
1963-64	5,467	12.1	34,206	75.6	5,548	12.3	45,227	100
1964-65	6,933	10.0	54,511	78.7	7,833	11.3	69,276	100
1965-66	7,879	9.5	61,853	74.7	13,109	15.8	82,841	100
1966-67	9,960	8.0	96,857	78.1	17,289	13.9	124,106	100
1967-68	6,668	7.8	61,988	72.5	16,841	19.7	85,497	100
1968-69	9,064	7.6	92,167	76.9	18,629	15.5	119,860	100
1969-70	7,952	6.2	100,776	78.6	19,482	15.2	128,209	100
1970-71	8,622	6.5	103,554	78.1	20,476	15.4	132,652	100
1971-72	7,216	5.5	104,410	79.3	20,038	15.2	131,664	100
1972-73	8,766	5.4	132,211	81.6	21,135	13.0	162,112	100
1973-74	7,284	4.5	132,475	82.4	21,056	13.1	160,815	100
1974-75	7,102	4.3	135,515	81.7	23,311	14.0	165,928	100
1975-76	6,890	3.9	144,527	82.1	24,628	14.0	176,043	100
1976-77	7,937	4.3	147,782	80.6	27,628	15.1	183,347	100
1977-78	7,784	4.8	130,929	79.6	25,790	15.6	164,504	100
1978-79	6,546	4.1	129,124	81.3	23,108	14.6	158,777	100
1979-80	7,098	3.5	173,229	84.5	24,739	12.0	205,067	100
1980-81	6,369	3.7	144,323	84.6	19,867	11.7	170,559	100

Source: [3]

^aIncludes oranges used in blended concentrates and processed hot pack concentrates orange juice.

Table 12. Costs of processing, warehousing, and selling Florida concentrated orange juice in 48/6-ounce cans in cases, 45° Brix, 1959-60 through 1979-80 seasons.

Season	Materials		Processing labor		Other processing expenses ^a		Warehousing		Selling, administrative & other expenses		Total processing cost	
	Cost	Index ^b	Cost	Index ^b	Cost	Index ^b	Cost	Index ^b	Cost	Index ^b	Cost	Index ^b
	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent
1959-60 ^c	1.1769	108	.2459	102	.4135	94	.0812	74	.2849	59	2.2024	93
1960-61 ^c	1.1368	104	.2422	101	.4245	96	.0838	76	.3000	63	2.1873	93
1961-62 ^c	1.0586	97	.1743	73	.3168	72	.1232	112	.3485	73	2.0214	86
1962-63 ^c	1.0283	94	.2588	108	.6065	138	.1487	135	.6138	128	2.6561	113
1963-64 ^c	1.0300	94	.2892	121	.4430	101	.1209	110	.8403	175	2.7234	115
1964-65 ^c	.9789	90	.2167	90	.3716	84	.1198	109	.4535	94	2.1405	91
1965-66	.9982	92	.2656	111	.3782	86	.1234	113	.6126	128	2.3780	101
1966-67	1.0208	94	.2117	88	.2759	63	.1053	96	.4526	94	2.0663	88
1967-68	1.0128	93	.2729	114	.3705	84	.1395	127	.4593	96	2.2550	96
1968-69	1.0279	94	.2776	116	.3380	77	.1112	101	.4853	101	2.2408	95
1969-70	1.0271	94	.2943	123	.3355	76	.1278	116	.5990	125	2.3837	101
1970-71	1.0627	97	.2881	120	.3769	86	.1354	123	.5641	118	2.4272	103
1971-72	1.0771	99	.2666	111	.3728	85	.1147	104	.5539	115	2.3851	101
1972-73	1.1815	108	.2978	124	.4170	95	.1358	123	.5789	121	2.6640	113
1973-74	1.3285	122	.3865	161	.4864	111	.1930	175	.6283	131	3.0227	128
1974-75	1.6534	152	.3654	152	.5130	117	.2240	204	.6637	138	3.4195	145
1975-76	1.5213	140	.3394	141	.5468	124	.2005	182	.6359	132	3.2439	137
1976-77	1.4557	134	.4463	186	.6302	143	.2196	200	.7366	153	3.4884	148
1977-78	1.5049	138	.4517	188	.6854	156	.2204	200	.7661	160	3.6285	154
1978-79	1.6011	147	.4515	188	.6615	150	.2268	206	.8188	171	3.7597	159
1979-80	1.7419	160	.4779	199	.6954	158	.2310	210	.7604	158	3.9066	166
Index	1.09		.24		.44		.11		.48		2.36	

Source: [7, 12]

^aIncludes utilities, maintenance and repairs, depreciation, rent, taxes, insurance and misc. other expenses.

^bPercentage of average value for 1959-60 through 1963-64 seasons (Index).

^c42° Brix

Table 13. Warehousing cost, carryover ending stocks and indices for Florida FCOJ, 1959-60 through 1980-81 seasons.

Season	Total December 1 carryover ^a	Index ^b	Warehousing ^c	Index ^b
	mil. gal. 45° Brix	Percent	\$/case 48 6-oz. cans	Percent
1959-60 ^d	9.663	61	.0812	73
1960-61 ^d	13.631	87	.0838	75
1961-62 ^d	33.750	215	.1232	110
1962-63 ^d	11.399	73	.1487	133
1963-64 ^d	10.136	64	.1209	108
1964-65 ^d	21.814	139	.1198	107
1965-66	12.828	82	.1234	111
1966-67	27.225	173	.1053	94
1967-68	12.885	82	.1395	125
1968-69	17.400	111	.1112	100
1969-70	26.566	169	.1278	115
1970-71	22.568	144	.1354	121
1971-72	28.000	178	.1147	103
1972-73	48.431	308	.1358	122
1973-74	48.861	311	.1930	173
1974-75	50.759	323	.2240	201
1975-76	53.709	342	.2005	180
1976-77	25,526	162	.2196	197
1977-78	30.909	197	.2204	197
1978-79	37.386	238	.2268	203
1979-80 ^e	54.856	349	.2310	207
1980-81	66.353	422	-	-
Index	15.716		.1116	

^aSource: [2]

^bPercentage of average value for 1959-60 through 1963-64 seasons (Index).

^cSource: [7, 12]

^d42° Brix.

^e43.4° Brix.

Other items were quite stable until the last six seasons. Material costs were just below base period levels during the 1971-72 season but increased to 152 percent of the base period level in the 1974-75 season and then decreased, only to increase five years later to 160 percent. Labor expenses have almost doubled since the 1971-72 season. Both processing and administrative expenses have increased to 158 percent and total processing costs have trended upward since the 1964-65 season.

For grapefruit, the dominant product form is frozen concentrated grapefruit juice Table. . . . It replaced canned single strength juice as the dominant product form during the 1978-79 season. A cost series of sufficient length does not exist for frozen concentrated grapefruit juice; therefore, canned single strength juice will be used to illustrate cost trends. For one case of 12 46-ounce cans, many of the items have followed trends similar to those for frozen concentrated orange juice. Other processing expenses have shown the greatest increase relative to the base period (202 in 1979-80). Total processing costs have increased significantly since the 1977-78 seasons (Table 15).

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 would have 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

Table 14. Utilization of grapefruit by type of processed products, 1959-60 through 1980-81 seasons.

Season	Canned single-strength juice, sections and salads		Frozen concentrate ^a		Chilled juice, sections and salads		Total Processed	
	Boxes used	Percent of total	Boxes used	Percent of total	Boxes used	Percent of total	Boxes used	Percent of total
	1000 boxes	Percent	1000 boxes	Percent	1000 boxes	Percent	1000 boxes	Percent
1959-60	11,494	80.8	1,613	11.3	1,119	7.9	14,226	100
1960-61	11,046	69.8	3,603	22.7	1,195	7.5	15,844	100
1961-62	12,385	74.8	2,773	16.7	1,402	8.5	16,506	100
1962-63	11,439	71.7	3,260	20.4	1,258	7.9	15,957	100
1963-64	7,387	63.8	2,407	20.8	1,784	15.4	11,578	100
1964-65	10,937	68.7	3,551	22.3	1,441	9.0	15,929	100
1965-66	13,242	67.6	4,010	20.4	2,363	12.0	19,615	100
1966-67	18,105	69.0	5,405	20.6	2,736	10.4	26,241	100
1967-68	13,411	74.1	1,793	9.9	2,904	16.0	18,108	100
1968-69	15,940	61.8	6,550	25.4	3,307	12.8	25,797	100
1969-70	15,604	67.4	4,579	19.7	2,983	12.9	23,166	100
1970-71	17,679	63.3	6,819	24.4	3,439	12.3	27,937	100
1971-72	17,121	57.0	8,725	29.0	4,201	14.0	30,047	100
1972-73	16,034	56.5	8,212	29.0	4,119	14.5	28,365	100
1973-74	16,794	57.2	8,732	29.7	3,843	13.1	39,369	100
1974-75	13,664	53.1	7,779	30.2	4,305	16.7	25,748	100
1975-76	14,410	50.8	8,987	31.7	4,974	17.5	28,371	100
1976-77	16,217	47.0	13,020	37.7	5,265	15.3	34,503	100
1977-78	14,173	42.0	13,999	42.0	5,293	16.0	33,465	100
1978-79	13,037	43.1	13,276	43.9	3,933	13.0	30,246	100
1979-80	12,461	35.3	18,506	52.3	4,393	12.4	35,360	100
1980-81	10,140	30.6	19,490	58.9	3,489	10.5	33,118	100

Source: [3]

^aIncludes grapefruit used in blended concentrates and processed hot pack concentrated grapefruit juice.

Table 15. Cost of processing, warehousing, and selling Florida unsweetened grapefruit juice in 12 46-ounce cans of juice in cases, 1959-60 through 1979-80 seasons.

Season	Materials		Processing labor		Other processing expenses ^a		Warehousing		Selling, administrative & other expenses		Total processing cost	
	Cost	Index ^b	Cost	Index ^b	Cost	Index ^b	Cost	Index ^b	Cost	Index ^b	Cost	Index ^b
	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent	\$/case	Percent
1995-60	1.0348	98	.1449	111	.1355	97	.0283	40	.1596	76	1.5031	93
1960-61	1.0616	100	.1447	111	.1378	98	.0375	54	.1854	88	1.5670	97
1961-62	1.0623	100	.0895	69	.1167	83	.0837	120	.1917	91	1.5439	96
1962-63	1.0726	101	.1174	90	.1505	108	.1054	151	.2752	131	1.7211	107
1963-64	1.0678	101	.1298	100	.1676	120	.0942	135	.2621	125	1.7215	107
1964-65	1.0849	102	.1120	86	.1218	87	.0809	116	.2220	106	1.6216	101
1965-66	1.1175	105	.1210	93	.1312	94	.0947	135	.2385	114	1.7029	106
1966-67	1.1241	106	.1304	100	.1164	83	.0929	133	.2133	102	1.6771	104
1967-68	1.1537	109	.1688	130	.1588	113	.1245	178	.2729	130	1.8787	117
1968-69	1.1971	113	.1745	134	.1497	107	.1109	158	.2320	110	1.8642	116
1969-70	1.1882	112	.2101	162	.1752	125	.1133	162	.2977	142	1.9845	123
1970-71	1.1780	111	.2081	160	.1983	142	.1337	191	.3412	162	2.0593	128
1971-72	1.2005	113	.2004	154	.2007	143	.1352	193	.3217	153	2.0585	128
1972-73	1.2583	119	.2104	162	.2157	154	.1756	251	.2956	141	2.1556	134
1973-74	1.3664	129	.1856	143	.2273	162	.2321	332	.3813	182	2.3927	149
1974-75	1.8672	176	.1920	148	.2336	167	.2293	328	.3470	165	2.8691	178
1975-76	1.7765	168	.1985	153	.3062	219	.1797	257	.3639	173	2.8248	175
1976-77	1.7825	168	.2501	192	.3143	225	.2007	287	.3715	177	2.9191	181
1977-78	1.9602	185	.2721	209	.3186	228	.2011	287	.3978	189	3.1498	196
1978-79	2.2258	210	.2805	216	.3699	264	.2014	288	.4115	196	3.4891	217
1979-80	2.5544	241	.3146	242	.4229	302	.2109	301	.4891	233	3.9919	248
Index	1.06		.13		.14		.07		.21		1.61	

Source: [7, 12]

^aIncludes utilities, maintenance and repairs, depreciation, rent, taxes, insurance and misc. other expenses.

^bPercentage of average value for 1959-60 through 1963-64 seasons (Index).

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. At the retail level, prices reported for frozen products by the Market Research Corporation of America and NPD Research Inc., and USDA prices for fresh fruit were used.

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 his 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 fresh grapefruit. On the other hand, the F.O.B.-retail margins for frozen concentrated orange juice and canned single-strength grapefruit juice average 27 and 26 percent of retail value (Tables 17 and 18). No trend in the F.O.B.-retail margin is indicated.

It is difficult to explain why the F.O.B.-retail margin for processed products is a smaller percentage of the retail price than

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 1979-80 seasons.

Season	Retail Value ^a		F.O.B.-retail margin		Packing cost ^c		Picking & hauling costs ^c		On-tree value plus marketing firm profits ^d	
	Cost	Share	Cost	Share	Cost	Share	Cost	Share	Cost	Share
	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent	\$/box	Percent
1964-65	10.57	100	6.45	61	1.37	13	.45	4	2.30	22
1965-66	10.00	100	5.69	57	1.41	14	.50	5	2.40	24
1966-67	9.33	100	5.94	64	1.41	15	.48	5	1.50	16
1967-68	10.85	100	5.82	54	1.56	14	.55	5	2.92	27
1968-69	11.02	100	7.21	65	1.57	14	.55	5	1.70	15
1969-70	11.48	100	6.82	60	1.66	14	.60	5	2.40	21
1970-71	11.22	100	6.68	60	1.71	15	.62	5	2.21	20
1971-72	12.54	100	7.27	58	1.72	14	.66	5	2.89	23
1972-73	13.47	100	7.98	59	1.77	13	.74	6	2.98	22
1973-74	13.97	100	8.81	63	2.06	15	.85	6	2.25	16
1974-75	15.02	100	9.40	63	2.21	15	.83	5	2.58	17
1975-76	14.48	100	9.22	63	2.27	16	.85	6	2.14	15
	(16.32) ^b	(100)	(11.06)	(68)	(2.27)	(14)	(.85)	(5)	(2.14)	(13)
1976-77	15.76	100	10.08	64	2.55	16	.91	6	2.22	14
	(18.79) ^b	(100)	(13.11)	(70)	(2.55)	(13)	(.91)	(5)	(2.22)	(12)
1977-78	18.11	100	12.62	70	2.43	13	.82	5	2.24	12
1978-79	28.22	100	21.22	75	2.62	9	.90	3	3.48	13
1979-80	36.04 ^b	100	27.86	77	2.89	8	.93	3	4.36	12
Standard Deviation			3.24	(3.81) ^b	.967	(2.70) ^b	.599	(1.10) ^b	4.13	(.548) ^b
Mean			60.8	(72) ^b	14.5	(11.4) ^b	5.2	(4.2) ^b	19.4	(12.4) ^b
Coefficient of Variation			.053	(.053) ^b	.067	(.237) ^b	.115	(.262) ^b	.213	(.054) ^b

Source:

^aSix-month weighted average (Nov.-April), white seedless, size 40 packed in two 4/5-bushel cartons, average for Atlanta, Boston, Chicago, and Pittsburgh. Returns to retailer for saleable fruit (3 percent allowance for loss incurred during marketing process).

^bSix-month weighted average (Nov.-April), grapefruit, reported as cents per pound in New York City.

^cCosts do not include profits.

^dThis value includes pick and haul and packinghouse firm profits.

Table 17. Proportion of the consumer's food dollar spent on six-ounce cans of frozen concentrated orange juice that is returned to various marketing channel participants, 1964-65 through 1979-80 seasons.

Season	Retail value		F.O.B.-retail margin		Processing costs ^a		Picking & hauling costs ^a		On-tree value plus marketing firm profits ^b	
	Cost	Share	Cost	Share	Cost	Share	Cost	Share	Returns	Share
	\$/doz.	Percent	\$/doz.	Percent	\$/doz.	Percent	\$/doz.	Percent	\$/doz.	Percent
1964-65	2.32	100	.70	30	.54	23	.19	8	.89	39
1965-66	2.20	100	.58	26	.59	27	.26	12	.77	35
1966-67	1.75	100	.56	32	.52	30	.24	14	.43	24
1967-68	2.15	100	.53	25	.56	26	.28	13	.78	36
1968-69	2.44	100	.66	27	.56	23	.35	14	.87	36
1969-70	2.17	100	.71	33	.60	28	.34	16	.52	24
1970-71	2.22	100	.62	28	.61	28	.36	16	.63	28
1971-72	2.46	100	.58	24	.60	24	.37	15	.91	37
1972-73	2.39	100	.65	27	.67	28	.41	17	.66	28
1973-74	2.44	100	.64	26	.76	31	.46	19	.58	24
1974-75	2.60	100	.57	22	.60	23	.43	17	1.00	38
1975-76	2.67	100	.67	25	.81	30	.44	17	.75	28
1976-77	3.20	100	.75	24	.87	27	.58	18	1.00	31
1977-78	4.33	100	1.03	24	.91	21	.56	13	1.83	42
1978-79	4.61	100	1.11	24	.94	20	.59	13	1.97	43
1979-80	4.51	100	1.47	33	.73	16	.61	13	1.70	38
Standard Deviation				3.44		4.13		2.75		6.46
Mean				26.9		25.3		14.7		33.2
Coefficient of Variation				.128		.163		.187		.195

^aCosts do not include profits.

^bThis value includes pick and haul and processing firm profits.

Table 18. Proportion of the consumer's food dollar spent on 12 46-ounce cans of single strength grapefruit juices that is returned to various marketing channel participants, 1964-65 through 1979-80 seasons.

Season	Retail value		F.O.B.--retail margin		Processing costs ^a		Picking & hauling costs ^a		On-tree value plus marketing firm profits ^b	
	Cost	Share	Cost	Share	Cost	Share	Cost	Share	Cost	Share
	<u>\$/case</u>	<u>Percent</u>	<u>\$/case</u>	<u>Percent</u>	<u>\$/case</u>	<u>Percent</u>	<u>\$/case</u>	<u>Percent</u>	<u>\$/case</u>	<u>Percent</u>
1964-65	4.43	100	1.27	29	1.62	37	.42	9	1.12	25
1965-66	4.67	100	1.38	30	1.70	36	.49	10	1.10	24
1966-67	4.03	100	1.34	33	1.68	42	.46	11	.55	14
1967-68	4.71	100	1.20	26	1.88	40	.53	11	1.10	23
1968-69	4.50	100	1.43	32	1.86	41	.55	12	.66	15
1969-70	5.42	100	1.36	25	1.98	37	.58	11	1.50	28
1970-71	5.74	100	1.34	23	2.06	36	.59	10	1.75	31
1971-72	5.81	100	1.33	23	2.06	36	.60	10	1.82	31
1972-73	5.60	100	1.48	26	2.16	39	.68	12	1.28	23
1973-74	5.59	100	1.40	25	2.52	45	.78	14	.89	16
1974-75	5.91	100	1.57	27	2.87	49	.78	13	.69	11
1975-76	5.90	100	1.51	26	2.82	48	.78	13	.79	13
1976-77	6.52	100	1.51	23	2.92	45	.96	15	1.13	17
1977-78	6.78	100	1.73	26	3.15	46	.80	12	1.10	16
1978-79	7.62	100	1.58	21	3.49	46	.84	11	1.71	22
1979-80	9.44	100	2.34	25	3.99	42	.85	9	2.26	24
Standard Deviation				3.32		4.50		1.71		6.28
Mean				26.3		41.6		11.4		21.1
Coefficient of Variation				.126		.108		.150		.298

Source:

^aCosts do not include profits.

^bThis value includes pick and haul and processing firm profits.

the margin for fresh fruit because of the absence of accurate wholesaling and retailing cost data. Factors that would have to be considered include comparative sales revenues per unit of floor space, added packaging that may be added to fresh fruit and the weight of fresh fruit relative to its value. Perishability may also be an important factor although fresh citrus wholesale and retail spoilage have been estimated at very low levels [15].

COSTS OF MARKETING CHANNEL FUNCTIONS

While previous sections have been concerned with individual 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 was calculated for frozen concentrated orange juice (Table 17). On-tree returns have shown the greatest variability and are followed closely by picking and hauling costs (Table 17). F.O.B.-retail margins have shown the least amount of variation.

For the 16 years shown, on-tree returns are 33 percent of the average retail price paid for orange concentrate in 6-ounce cans. The F.O.B.-retail and processing costs have averaged 27 and 25 percent. Picking and hauling costs have been the element accounting for the lowest percentage of the retail dollar.

For canned grapefruit juice the relative proportion of the retail dollar to processing costs is much higher than for concentrate (42 compared to 25) (Table 17 and 18). Picking and hauling costs represent a lower percentage of the retail dollar (11 percent) while grower returns are 21 percent and show the most variation (.298). The F.O.B.-retail margin is approximately 26 percent of the retail dollar and shows slightly more variation than processing costs.

The most striking contrast between relative margins for marketing channel participants is the extremely high F.O.B.-retail margin in fresh grapefruit accounting for 61 (72) percent of the retail food dollar for the past 13 (5) seasons (Table 16). For every dollar a consumer has spent on fresh grapefruit the past 13 seasons, 61 (72) cents pays for services after it leaves Florida packinghouses. Growers receive 19 (12) cents and picking, hauling, packing and selling expenses account for another 20 (16) cents. On-tree returns (packing, picking and hauling costs) display the greatest variability.

SUMMARY

Total citrus acreage has stabilized after decreasing since 1970-71. Orange, grapefruit, and specialty fruit acreage represents 75, 17 and 8 percent of total acreage. Nominal on-tree value of citrus more than doubled since 1975-76. Growers have generally received a lower percentage of the consumer's dollar spent on fresh fruit than on processed products 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 increased.

Comparison of the coefficients of variation reveals that, in general, on-tree returns and pick and haul costs are more variable than any of the components of the citrus marketing bill, except for fresh grapefruit during the last five seasons (Tables 16, 17, 18). During the last five seasons, packing cost and pick and haul costs have been more variable.

Finally, total citrus packed has not returned to 1975-76 levels. The 4/5 fiberboard carton continues to be the predominate container for packing citrus. Since 1972-73, the packout percentage has trended upward.

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