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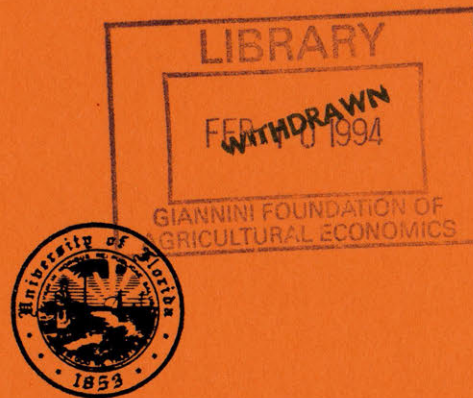
WAGE RATES AND LABOR PRACTICES
IN HARVESTING FLORIDA CITRUS

by

Leo C. Polopolus and Robert D. Emerson

Staff Paper SP92-24

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FOOD AND RESOURCE ECONOMICS DEPARTMENT

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ABSTRACT

The pick and haul function is just as important as the production function in terms of economic success of the overall citrus enterprise. Harvesting operations, particularly, require large numbers of workers, coordination, and effective field management.

This paper seeks to identify the employment relationships in harvesting fruit. The activities of labor contractors and crew supervisors are defined and contrasted. The variability of piece rates paid for citrus harvesting is analyzed, along with an analysis of factors contributing to the variability of compensation paid to independent contractors and crew supervisors.

KEY WORDS

citrus, wage rates, piece rates, labor contractors,
crew supervisors, oranges for processing

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WAGE RATES AND LABOR PRACTICES IN HARVESTING FLORIDA CITRUS

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Introduction

Citrus growers have a tendency to concentrate their efforts on the production aspects of their annual crop. What is often overlooked is the fact that the pick and haul function is just as important and often can determine the difference between economic success or failure in this enterprise.

The human input of labor services is the essential and critical element of the harvesting operation. Harvesting costs are determined in large measure by wage rates, the level of technology, and the productivity of the work force. Under current conditions in Florida, mechanical harvesting of citrus is not widely practiced. Thus, manual methods of picking citrus require the recruitment and employment of as many as 30,000 workers in the peak week of harvest operations in late January of each year.

The common method of payment of citrus workers is by the piece rate, usually in terms of X cents per 90 pound box. This piece rate is determined by the laws of supply and demand for labor. Shortages of farm labor will cause the piece rate to go up, other factors held constant; reduction in the demand for farm labor from a small citrus crop will cause the piece rate to go down, other factors held constant. As we will discuss later, the piece rate can also

be affected by the productivity (yield) of the grove, tree height, and other factors. Thus, for any given day of citrus harvest in Florida, the piece rate can vary from 55 cents per box to over \$1.50 per box.

Government programs and policies can also affect not only the piece rate, but also the overall cost of harvesting citrus. While Florida piece rates for citrus harvest operations translate to hourly wage rates above the federal minimum wage of \$4.25 per hour, successive increases in the federal minimum wage have the tendency to increase the level of wage rates for harvesting Florida citrus.

Another federal program that has had an impact on wage rates has been the Immigration Reform and Control Act of 1986. This program has many facets, but a key provision has to do with the heavy penalties and fines on employers who knowingly recruit or hire illegal aliens. In a nutshell, if this Act were strictly enforced, the supply of farm labor would be lessened, and harvest wage rates would most likely be higher than they are now.

The large number of other government labor and environmental programs contribute to added costs of operations, as well as added problems with firm organization and management. Some of these programs include the following: Occupational Safety and Health Act (OSHA), Social Security (federal), Child Labor laws (state and federal), Unemployment Insurance (state and federal), Migrant and Seasonal Agricultural Worker Protection Act (federal), Farm Labor Contractor Registration (state), Field Sanitation and Drinking Water (state and federal), Farm Labor Camps (federal), Migrant Labor Housing (state), Motor Carrier Safety Law (federal), Transportation of Farm Workers (state), Workers' Compensation (state), OSHA Hazard Communication Standard (federal), Right to Know Law (state), Income Tax Withholding for

Farmworkers (federal), and Human Rights laws (state and federal).

Within this burdensome regulatory environment, it is not surprising that citrus growers have chosen to relieve themselves of many of these administrative and bureaucratic requirements. Thus, labor contractors and other non-grower units have replaced the grower as the responsible employer for most harvest workers.

Employment Relationships for Harvesting Fruit

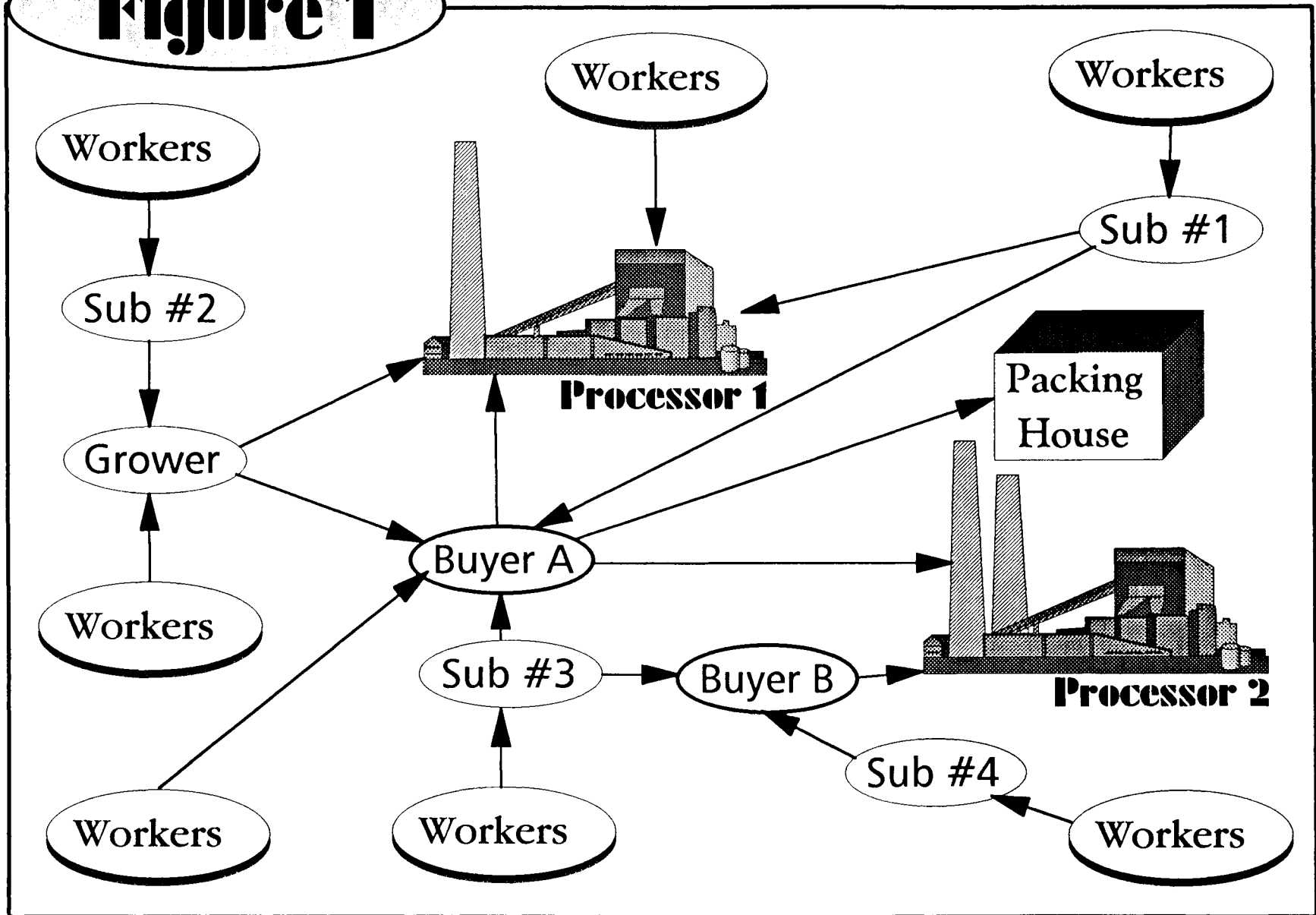
Unlike much of traditional American agriculture, the primary employer of citrus harvesting labor is not the farmer. The employer of harvesting workers is typically a third party that either harvests fruit only or engages in other citrus non-production activities. These third party employers include labor contractors, processing firms, packing houses, and independent buyers (bird dogs) of fruit (Polopolus and Emerson, July 1991).

What is even more interesting is that each potential employer of harvest workers has the option of hiring workers directly or contracting with labor contractors, sometimes called "subs" for labor intermediaries or subcontractors. As shown in Figure 1, the citrus processor may employ his own harvest workers directly, i.e., with "own" company crews, or the processor may "contract" with Subcontractor 1, who in turn hires workers directly. A second example would find a grower delivering fruit to the same processor, but with fruit picked by workers employed by Subcontractor 2. Thirdly, an independent buyer A, a "bird dog", may deliver fruit to Processor 1, but with fruit picked by Subcontractor 3. Subcontractors 3 and 4 may be simultaneously harvesting fruit for the same bird dog, Buyer B (Figure 1).

In this example, Subcontractor 3 is simultaneously harvesting fruit for Buyers A and B.

Figure 1

Citrus Harvesting Employment Arrangements



While Figure 1 appears to be complicated, it is merely a simplified snapshot of the real and intertwined employment relationships which occur in the Florida citrus industry. The important point here is that independent labor contractors are viable alternative employers for all types of owners of fruit in need of harvesting, i.e., growers, processors, packing houses, and independent buyers.

Labor Contractors Versus Crew Supervisors

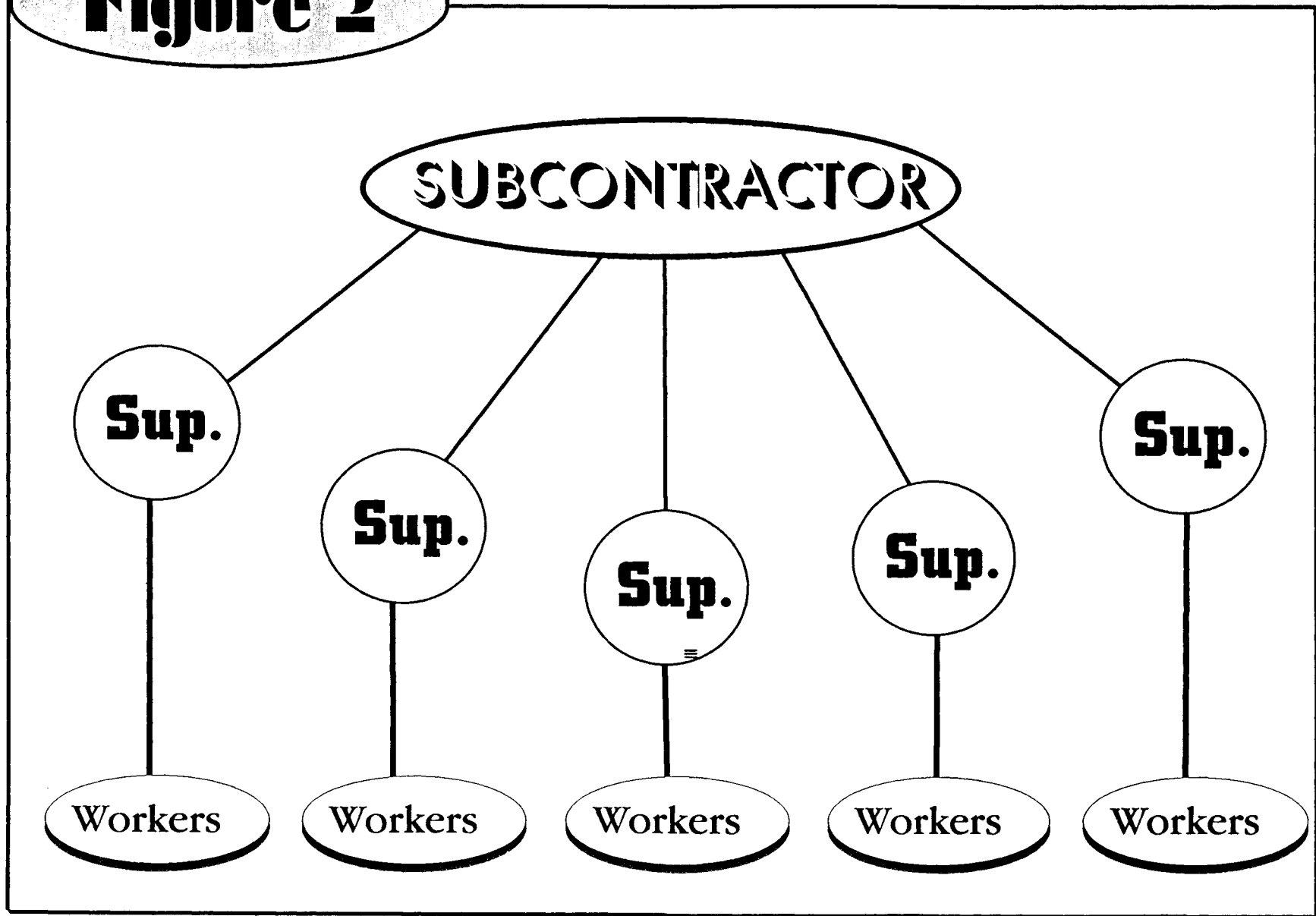
Labor contractors are independent employers. They receive payment from the fruit owners (growers, processors, packers, bird dogs), in excess of the piece rate that the workers receive. The excess payment or residual over the piece rate represents the contractor's compensation for his entrepreneurial activities, such as crew supervision, administration of taxes and payroll, goat loading (field assembly functions), machinery and equipment ownership, and/or hauling of fruit from grove to the processing or packing plant.

As labor contractors increase their size of operations, they also behave like other entrepreneurs in terms of labor organization and management. Contractors allocate routine management chores to crew leaders for supervision of teams (crews) of pickers usually numbering between 20 and 25 pickers per crew (Figure 2).

Crew leaders or crew supervisors are responsible for managing individual crews, but these crew leaders are not the employers of the crews. The exception, of course, is in cases where a labor contractor has only a single crew; in this case the labor contractor also assumes the routine duties of crew leaders.

Figure 2

Subcontractor Crew Supervision



Activities Performed by Labor Contractors

Based on surveys conducted jointly by the University of Florida and the Florida Department of Labor and Employment Security, the activities of labor contractors in orange harvesting for processing have been documented for the 1990, 1991, and 1992 seasons. In each of these seasons, the role of the labor contractors has been dominant as employers of harvest workers. For example, in the 1990 Florida Valencia orange survey, 42 of the 55 responding employers, or 76 per cent, were farm labor contractors.

All of these labor contractors harvested the fruit, provided the goat loader, paid workers' compensation, unemployment insurance, social security, and withholding tax, and maintained the payroll (Table 1). All of the labor contractors reported that they had federal and state crew leader registration cards. Only two of these crews of labor contractors did not do the roadsiding of the fruit. Those contractors that hauled fruit to the processor also provided their trucks for doing so. Auto insurance and liability insurance were provided for 87 per cent and 96 per cent of the crews, respectively, (Table 1).

Table 1. Activities Performed by Labor Contractors, Florida Valencia Orange Harvest, Spring 1990.

Activity	Number of Crews	Percent of Crews
Harvesting the fruit	94	100
Roadsiding	92	98
Provide goat loader	94	100
Haul the fruit	42	45
Provide trucks for hauling	42	45
Auto insurance	82	87
Liability insurance	90	96
Workers' compensation	94	100
Unemployment insurance	94	100
Pay workers' social security	94	100
Withholding income tax	94	100
Maintain payroll	94	100
Crew leader registration (state/federal)	94	100

Source: Emerson, Chunkasut, Moon, and Polopolus, 1990.

Activities Performed by Crew Supervisors

Crew supervisors or crew leaders carry out assigned duties by either grove owners who have their own crews or independent labor contractors with two or more crews. Crew supervisors are not employers since they are not responsible for paying workers for fruit harvested.

Based on our surveys of Florida orange harvesting, crew supervisors are primarily responsible for general supervision of the harvest crew, assigning workers to specific areas, operating the goat loader, recruiting workers to fill out the crew, and distributing pay checks. In many cases, they also assist with transporting workers to the grove or to the picking site. In a few cases, crew supervisors provide the goat loader or supervise the goat loader (Table 2).

Table 2. Activities Performed by Crew Supervisors, Florida Valencia Orange Harvest, Spring 1990.

Activity	Number of Crews	Per Cent of Crews
Total crews	157	100
Supervision		
General supervision of crew	150	96
Assign workers to specific area	151	96
Goat loader operation		
Operate goat loader	137	
Provide goat loader	27	87
Supervise goat loader	16	17
		10
Transporting workers		
Transport workers to grove	89	
Transport to picking site	74	57
Provide vehicle	56	47
		35
Other		
Recruit workers to fill crew	134	
Distribute pay checks	131	85
		83

Source: Emerson, Chunkasut, Moon, and Polopolus, 1990.

Piece Rates Paid For Harvesting Florida Oranges

Average piece rates paid for harvesting oranges for processing have increased approximately in line with inflation over the past several seasons. More interestingly, there is considerable variation of piece rates for picking citrus on any given harvest day of any season.

From our Valencia orange survey in 1991, for example, we discovered that piece rates varied from 55 cents per 90 pound box to \$1.50 per box on March 19, 1991, the reference day for the survey. As shown in Table 3, there is a heavy clustering of piece rates between 65 and 70 cents per box. And prevailing wage rate determinations of the U.S. Department of Labor usually follow those concentrations of piece rates.

But the begging question is why are there so many different piece rates for picking the same variety of orange on the same day in the same state?

Potential sources for variation in the piece rates at any given time are differences in: (1) harvesting conditions; and (2) labor market conditions. Harvesting conditions can vary as a result of the grove conditions affecting the amount of time required for a worker to harvest a box of oranges. For example, a grove with a particularly low yield is likely to require a longer than average time for a worker to harvest a box of fruit, so that the piece rate per box would be expected to be higher. Similarly, trees which can be harvested without a ladder versus trees requiring a ladder for harvest may be a source of different piece rates. Although there is considerable mobility of workers within the Florida citrus harvest market, there remains the possibility of somewhat different labor market conditions in the different areas of the state. In the absence of better indicators corresponding to the exact time of harvest, the regional location is assumed to capture any significant differences in labor market conditions across the state.

Table 3. Piece Rates: Florida Valencia Orange Harvest, March 19, 1991.

Piece Rate (Cents per Box)	Number of Workers
55	34
60	158
65	1832
70	1877
74	351
75	604
80	721
85	29
90	75
95	2
100	92
125	21
150	15

Source: Emerson, Chunkasut, and Polopolus, 1991.

A statistical method for identifying the factors which have a significant influence on the piece rate level is least squares regression. The information collected from each employer in our survey provides data on harvesting conditions and geographic location (Central, East Coast, South Florida). Information was collected on yield per tree, tree height, whether or not there was spot harvesting, and groves with scattered producing trees.

Without going into the details of this regression analysis, the Valencia 1991 survey revealed that for the Central region of the Florida citrus belt the average piece rate was 72.8 cents per box for trees of average yield and average height. Groves yielding fewer than two boxes of Valencia oranges per tree increased the piece rate an estimated 22.67 cents per box, other factors held constant. This result was highly statistically significant (Appendix Table A).

Groves with yields over five boxes per tree reduced the piece rate only 2.6 cents per box. Excessively tall trees (over 15 feet) increased the piece rate just over 2 cents per box (Appendix Table A). Both of these conclusions are of only marginal statistical (and economic) significance.

Harvesting located in the East Coast region of the citrus belt appears to have a slight premium (just over 3 cents per box), although this result is only marginally significant statistically. The effect of a South Florida (below Highlands County) location provides a stronger statistical result, suggesting that piece rates in South Florida average 5.7 cents per box below those of the Central region, all other conditions being held equal. Regression analyses of the Early and Mid Season Orange harvest in 1991 revealed similar results to the Valencia survey (Appendix Table A).

Crew Leader and Labor Contractor Compensation

The piece rate paid for picking citrus fruit usually represents about one-half of the total cost of harvesting citrus. The non-picking harvesting costs occur whether or not independent labor contractors are involved. The point here is that many functions and services are performed (required) by employers in the course of harvesting a citrus crop. Many of these activities are outlined in Tables 1 and 2. Table 4 illustrates the average compensation paid to labor

contractors and crew supervisors for the 1991 Valencia orange harvest for processing.

**Table 4. Average Compensation for Labor Contractors and Crew Supervisors, 1991
Florida Valencia Orange Harvest.**

Group of Item	Cents per Box
Labor Contractor	
Contract Rate Paid	142
Contract Rate Less Piece Rate	70
Crew Supervisor Rate Paid	13
Piece Rate Paid Pickers	72

Source: Emerson, Chunkasut, and Polopolus, 1991.

The average rate per box received by labor contractors was \$1.42 for the 1991 Valencia Orange season. From this amount, the contractor pays the crew leader and the piece rate to the harvest worker. A useful measure of the payment to the labor contractor is the contract rate less the piece rate, or 70 cents for the above example. This is the amount the contractor has left to pay the crew leader, the goat loader, and any other activities that the contractor performs. The crew leader, by contrast, received an average of 13 cents per box. These rates also suggest the costs that would be incurred by grove owners if they were involved in similar activities. Of course, the rates paid to labor contractors and crew supervisors vary in accordance with the specific activities that each performs in the harvest operation.

Labor Contractor Compensation

Regression procedures were used to isolate the effects of particular activities on labor contractor compensation. The compensation being explained is the contract rate less the piece rate for each contract. This regression analysis was conducted for the 1990 Valencia, 1991 Early and Mid Season, and 1991 Valencia orange harvests. In each case the contracts were weighted by the number of boxes harvested under the contract so that small, but unusual contracts did not receive undue emphasis.

The results indicate that for the 1991 Valencia harvest, for example, labor contractor compensation was 49 cents per box when the contractor did not haul the oranges to the processing plant and did not provide the goatloader. (In addition to the 49 cents, the contractor was paid an additional amount for the piece rate for the pickers). The 49 cents per box includes compensation for the activities that all, or nearly all, of the contractors enumerated as performing. These include paying worker's compensation insurance, payroll taxes such as social security and unemployment insurance, auto and liability insurance, maintaining the workers' payroll, and other business expenses. Although the result is at the margin of statistical significance, contractors who provided the trucks and hauled the fruit to the processor received on average an additional 9.4 cents per box for this activity for the 1991 Valencia harvest. Those who provided the goatloader received an additional 19 cents per box (Appendix Table B).

Crew Supervisor Compensation

From Table 4 we learned that the average compensation rate for crew leaders for the 1991 Valencia season was 13 cents. In terms of individual functions or services provided by crew leaders, providing a vehicle for transporting workers to groves is estimated by our

regression analysis to have a value of 2.74 cents per box. The added responsibility of recruiting workers to fill the crew has a value of 3.5 cents per box. Operating and providing the goatloader have implicit values of 2.1 and 1.8 cents per box, respectively. The average crew leader compensation without any of these services was 4.66 cents per box for the Valencia 1991 orange harvest season (Appendix Table C). The other enumerated activities of crew supervisors, such as distributing pay checks, do not have statistically significant effects on the average crew supervisor's compensation. Also, neither the size of the crew nor the piece rate level had a systematic effect on the compensation of crew supervisors for the 1991 Valencia season. The regression analyses for the 1991 Early and Mid Season orange harvest yielded similar results regarding crew leader compensation.

Concluding Remarks

While piece rates are a major cost item in harvesting citrus, there are many other activities involved in the overall citrus harvesting function. Goat loading and roadsiding, for example, are also important activities that require equipment, labor, supervision, and management. There is a cost for these services whether or not independent labor contractors are involved.

From the results of our labor surveys of Florida orange harvests over the past three seasons, it is apparent that piece rates can be lowered, other factors held constant, where fruit yield per tree is high and trees are relatively short.

Whether growers opt for labor contractors or not depends on the effectiveness of growers in recruiting sufficient harvest labor, managing that labor during the harvest season, and meeting

the myriad of labor/environment regulations associated with the field harvest. In general, small and medium sized growers have more difficulty with fulfilling all of these functions when compared with large grove owners. Thus, small and medium sized growers are more likely to select independent labor contractors to harvest their citrus fruit.

In selecting labor contractors, citrus growers can also shift the risk of sanctions (penalties and fines) imposed by many labor and environment programs, particularly the potentially heavy fines of the Immigration Reform and Control Act (IRCA). Labor contractors are more adept at dealing with the threat of IRCA sanctions in the midst of the relatively large number of documented, illegal foreign workers in Florida (Polopolus and Emerson, Fourth Quarter 1991).

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APPENDIX TABLES

Appendix Table A. Piece Rate Regressions, Florida Orange Harvest, 1991.

Variable	Valencia 1991	Early&Mids 1991
Intercept	72.80 (62.10)	70.47 (52.11)
< 2 boxes per tree	22.67 (3.79)	27.32 (4.95)
> 5 boxes per tree	-2.63 (-1.89)	0.99 (0.63)
Trees < 8 feet tall	-1.19 (-0.32)	-3.20 (-1.19)
Trees > 15 feet tall	2.17 (1.65)	1.59 (0.97)
Spot harvesting selected trees	-1.26 (-0.36)	5.04 (0.28)
Spot harvesting selected fruit on tree		0.40 (0.02)
Scattered producing trees	-0.55 (-0.24)	2.89 (1.34)
East	3.05 (1.85)	4.32 (2.42)
South	-5.73 (-3.70)	-4.83 (-3.10)
R ²	0.18	.40
Number of observations	262	116

The number in parentheses are estimated t-statistics.

Appendix Table B. Labor Contractor Compensation, Florida Orange Harvests, 1990 and 1991.

Variable	Valencia 1991	Early & Mid 1991	Valencia 1990
Intercept	49.10 (5.66)	53.38 (2.09)	58.0 (2.21)
Haul oranges	9.41 (1.81)	10.78 (2.43)	35.0 (7.03)
Roadside		21.33 (1.05)	4.0 (0.17)
Provide goatloader	18.98 (2.03)	4.44 (0.62)	
Operate goatloader		-1.77 (-0.10)	
Auto & liability insurance		0.84 (0.14)	
Liability insurance			-3.0 (-0.17)
Auto insurance			8.0 (0.86)
Maintain payroll		-13.22 (-0.42)	
Transport workers		-9.13 (-1.17)	
R ²	0.12	0.25	.57
Number of contracts	75	44	47

Number in parentheses are estimated t-statistics.

Appendix Table C. Crew Supervisor Compensation, Florida Orange Harvest, 1991.

Variable	Valencia 1991	Early & Mid 1991
Intercept	5.16 (2.03)	5.31 (2.56)
Provide vehicle to transport workers	2.74 (4.11)	8.77 (14.87)
Transport workers	0.19 (0.30)	-3.30 (-5.35)
Assign workers to specific groups of trees	1.74 (1.33)	
Recruit workers for crew	3.55 (2.69)	2.24 (2.01)
Operate the goatloader	2.07 (2.54)	6.22 (4.29)
Provide the goatloader	1.83 (2.23)	4.62 (5.66)
Supervise the goatloader		2.88 (1.52)
Distribute the paychecks	0.26 (0.27)	1.58 (1.90)
Supervise more than one crew	1.65 (1.36)	-0.12 (-0.17)
Crew size	0.01 (0.35)	-0.09 (-3.39)
Piece rate	-0.01 (-0.50)	0.01 (0.23)
R ²	0.31	0.59
Number of crews	254	270

Number in parentheses are estimated t-statistics.