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THERE'S NO SUCH THING AS FREE HOUSING FOR HIRED AGRICULTURAL WORKERS

by

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ABSTRACT

One-quarter of hired agricultural workers live in housing that is provided without rent, whereas few workers in other industries are provided with rent-free housing as part of their employment compensation. Workers who live in rent-free housing are paid more than comparable agricultural workers, possibly reflecting the low-quality and isolation of such housing.

Unlike workers in most other sectors of the economy, a substantial share of hired agricultural workers live in housing that is provided without rent. In most cases, this rent-free housing is provided as part of a total compensation package by an employer. Thus, the joint housing-employment choice decision in agriculture differs from that of other industries. There have been few if any formal academic studies of agricultural workers' housing decisions or of rent-free housing.[1]

This study has two parts. First, the housing decision of hired agricultural workers is examined, then the value of rent-free housing is determined. The workers' housing decision is viewed as a two-step procedure. In the first step, workers choose between living in owned housing and nonowned housing. In the second step, workers who do not live in owned housing choose between living in rental housing and rent-free housing, conditional on their decision not to live in owned housing. In the second part of the study, the implicit value of the rent-free housing in terms of forgone wages or earnings is estimated, controlling for the nonrandom decisions of workers to live in such housing.

THE MODEL

A rational agricultural worker makes housing and employment decisions simultaneously, taking account of various market conditions and prices (wages, cost of housing, moving costs), housing amenities and externalities (the avail-

ability of schooling for children, pollution, and other local factors), and tastes. Unfortunately, no existing data set allows us to examine the joint housing-employment decision of agricultural workers in detail. As a result, the following model abstracts from the employment decision and concentrates on the housing decision.

Housing Decision

In this model, a given worker (or worker's family) decides on a type of housing using a two-step procedure. First, the worker decides to buy a house or not. Then, given the worker does not own, the worker either rents housing or receives it, "rent-free," as part of an employment compensation package. It seems probable that, all else the same, workers who are living in housing they own at the time of the survey are those who are less mobile than other workers. Alternatively stated, migrant agricultural workers (people who work in agriculture most of the year by moving to where crops are in season) are more likely to live in rental or rent-free housing at the time of the survey. Because the type and location of agricultural work (and possibly the type of worker surveyed) varies seasonally, there may be a strong seasonal component to this decision.

The choice of housing is estimated using a bivariate probit model with sample selection. Let y_1^* be an indicator variable with full range that reflects the strength of the desire to own a house: The more negative y_1^*, the more likely the worker is to live in owned housing. Another index, y_2^*, reflects the

desire of workers who live in nonowned housing to live in rent-free housing (rather than to pay rent). It is possible that the tradeoff reflected in y_2^* is between better quality housing for which one pays rent versus the convenience of not having to search for short-term housing and the (possibly) low, implicit cost of rent-free housing that is included as part of the compensation bundle for migrant workers.[2]

We do not observe these indexes, rather, we observe

$$\begin{aligned} y_i &= 1 \qquad \text{if } y_i^* > 0 \\ &= 0 \qquad \text{otherwise} \end{aligned} \tag{1}$$

where i = 1 or 2, $y_1 = 1$ if the worker does not own his or her housing (and zero if the worker owns the housing) and $y_2 = 1$ if the worker receives rent-free housing (and zero if the worker pays for housing), where y_2 is only observed if $y_1 = 1$.

The variables that determine ownership, X_1, and rental status, X_2, include factors that reflect market conditions or housing amenities (the location of the work and housing, the agricultural industry, and seasonal dummy variables) and demographic characteristics (which control for differences in productivity and taste). The equations for the indexes are:

$$y_i^* = \beta_i' X_i + \varepsilon_i, \tag{2}$$

where $\varepsilon_i \sim N(0,1)$, with $\text{corr}(\varepsilon_1,\varepsilon_2) = \rho$, and (y_2, X_2) is only observed when $y_1 = 1$. The workers who choose between renting and receiving rent-free housing may

not be a random sample of all hired workers in agriculture. The model is estimated taking account of this sample selection bias using maximum likelihood techniques.[3]

For comparison, a simpler model where workers choose between rent-free housing and other housing (owned and rental housing) is also presented. That is, owned and rented housing are lumped together. This model differs from the one above in that only a single probit housing-type equation is estimated.

Wages and Earnings

Wages, hours, and hence earnings are also conditional on the occupational housing decision as well as demographic and geographic factors. Whether workers who receive rent-free housing as part of their compensation package are paid more or less than other workers is uncertain. On the one hand, since the housing has some value, we would expect that workers who receive rent-free housing are paid less than they otherwise would be.

On the other hand, there are two factors that may offset the first effect and lead to no wage reduction or a wage increase. First, we only observe wages and not other benefits. Thus, it may be that other benefits rather than wages are cut to compensate for the housing (though benefits and other such nonwage compensations are relatively rare among agricultural workers in general and migrant workers in particular). Second, rent-free housing is often very low-quality (possibly even substandard) housing. Migrant or other workers

employed in an isolated area may not be able to find alternative, higher-quality housing. Thus, it may take a wage premium to induce them to live in isolated, low-quality housing. To sort out whether the positive or negative effects dominate, a regression model is used.

Wages (z_1: usual weekly earnings divided by usual weekly hours) and usual earnings (z_2) are regressed on demographic and geographic variables, W_j, and y_2 (whether the housing is rent-free):

$$z_j = \alpha_j' W_j + \delta_j y_2 + \eta_j, \tag{3}$$

where j = 1 or 2, and δ_j is a coefficient reflecting the value (or cost) of rent-free housing. These reduced-form equations are estimated using instrumental variables techniques, since y_2 is endogenous.[4]

THE DATA

A national sample of agricultural workers was obtained from the Bureau of Labor Statistic's (BLS) 1984 Current Population Survey (CPS). The BLS randomly samples from all U. S. housing units, including all types of housing (houses, apartments, mobile homes, transient and nontransient hotels, and so forth). The CPS contains information on an individual's housing (at the time of the survey), geographic location, demographic characteristics, wages and hours worked for the week of the survey.[5]

In the following, the sample is restricted to only hired agricultural workers who are currently employed and who answered questions on all relevant

variables. Foremen and managers are not included in the sample on the grounds that their compensation is more complex and different from that of typical workers. For piece workers, implicit wages are determined by dividing reported weekly earnings by weekly hours. The sample covers 1785 workers.[6]

Summary statistics for the entire sample, owners, those with rent-free housing, and renters are shown in Table 1. Nearly half the sample lives in owned housing. Roughly a quarter of the sample lives in rental housing and a quarter in rent-free housing.

Workers who receive rent-free housing are less likely to live in the North Central and more likely to live in the South and West than are those who own housing. Of the three major agricultural states, rent-free housing is relatively uncommon in California and Florida and relatively common in Texas.[7]

Agricultural workers who live in owned housing tend to be younger, are more likely white, more likely female, better educated, less likely Hispanic, less likely married (but more likely to have a young child), and less likely to be a household head than those who receive rent-free housing. A little over half of both those who live in rent-free and owned housing work on crops, but 70% of those who pay rent work on crops.

The average (unconditional) wage of those who live in owned housing is $4.09 per hour, of those who pay rent is $4.13, and of those who receive rent-free housing is $3.89. The average usual weekly hours worked are higher for those who receive rent-free housing (47.8) than those who live in owned

housing (37.7) and those who pay rent (41.3). Because their longer hours more than compensate for their relatively low wages, workers who live in rent-free housing have higher usual weekly earnings than others.[8]

THE HOUSING DECISION

As mentioned above, two models of the housing decision were estimated. The simpler model estimates whether a worker lives in rent-free housing or other. The relevant probit coefficients and asymptotic t-statistics (against the null hypothesis that the coefficient is zero) are shown in the first two columns of Table 2.

Simple Housing Model

This model correctly predicts 76% of the sample. The four pseudo-R^2 measures range from 0.11 to 0.17. This model tends to underpredict living in rent-free housing, however. There is not a clear racial or ethnic pattern to who lives in rent-free housing. Females, the well-educated, non-household heads, the nonmarried, Californians, and those who work on crops are less likely to live in rent-free housing. Younger workers (those under 30) are more likely to live in rent-free housing, while older workers are less likely. The least likely months to live in rent-free housing are February through April or May, which is consistent with the view that such housing is for migrant workers.

In order to indicate the size of the effects involved, the difference in the probability of living in rent-free housing are shown in the first column of Table 3. For dummy variables, the change in probability is the probability evaluated

using the estimated equation at the sample means (first column of Table 1) where the relevant dummy variable is set to one minus the probability where that variable is set to zero. The probability differences reported in the first column of Table 3 are based on coefficients with asymptotic t-statistics greater than 1.96, except for white and Hispanic. Married individuals are nearly 22% (46.29% - 24.56%) more likely to live in rent-free housing than nonmarried workers. Male workers are nearly 28% more likely to live in rent-free housing than females and those who work in crops are nearly 22% more likely than those who do not. The effects of the other demographic variables are smaller. There are pronounced regional and seasonal differences, as shown in Table 3.

Preferred Housing Model

The preferred model is a bivariate probit model with sample selection. The first equation estimates the probability of living in nonowned housing conditional on demographic and other characteristics. The second equation estimates the probability of living in rent-free housing conditional on demographic and other characteristics and that the individual is a nonowner. The two probit equations are shown in the last four columns of Table 2. Using the entire sample, the nonownership equation (columns 3 and 4) does a relatively good job of sorting. The pseudo-R^2 measures range from 0.16 to 0.26 and 70% of the sample are correctly predicted.

Younger workers (up to 26 years old) are less likely to own than older workers, as shown in the second column of Table 3, however, the difference in

probabilities is small. Married workers, nonwhites, males, the relatively uneducated, Hispanics, those without young children, and household heads are relatively unlikely to own. Somewhat surprising, married workers have a nearly 25% higher probability of not owning than unmarried workers. Whites are 13% more likely to own than nonwhites. Hispanic workers are 9% less likely to own than non-Hispanics. Male agricultural workers are a third less likely to own than females. The estimates for the differences in probabilities for crop, Florida, and California are based on coefficients with t-statistics less than 1.96.

The rent-free equation (Table 2 columns 5 and 6) was estimated conditional on not owning.[9] The pseudo-R^2 measures range from 0.11 to 0.18 and 66% of the sample are correctly predicted. In the preferred model, 68% of those who lived in rent-free housing are correctly predicted (where the prediction is the joint probability of not owning and in living in rent-free housing); whereas, in the single equation model, only 13% are correctly predicted.

In the preferred model, the rent-free probit indicates that only one demographic variable has a statistically significant effect on whether a nonowner lives in rent-free housing: Females are 15% less likely to live in rent-free housing than in rental units. As a result, the differences in probabilities for demographic variables shown in the last two columns of Table 3 should be viewed with some caution. Other statistically significant effects are that those who work in crops or do not live in Florida or California are more likely to live in rent-free housing.

In contrast, the simpler model shows that many more demographic characteristics are important in determining whether a worker lives in rent-free housing. The preferred model shows that the reason these demographic characteristics are important in the simpler model is that they determine whether workers are owners -- not whether nonowners live in rent-free housing versus housing for which rent is charged.

For example, a female worker is 28% less likely to live in rent-free housing (Table 3, column 1) than a male according to the simpler model. According to the preferred model, a female is 34% more likely to own than a male worker (Table 3, column 2). A female who does not own, however, is 15% less likely to live in rent-free housing than a male (Table 3, column 3). As a result, since a female is more likely to own and more likely to live in housing for which she pays rent than a man, she is 34% less likely to live in rent-free housing (Table 3, column 4).

THE VALUE OF HOUSING

These results show that workers are more or less likely to live in rent-free housing depending on their demographic characteristics, location, industry, and the season. The question remains, however, as to how valuable rent-free housing is, in terms of foregone wages or earnings.[10] Table 4 shows both ordinary least squares and instrumental variable estimates (using the preferred model) of the wage (cents per hour) and the instrumental variables estimate of weekly earnings (dollars).[11]

Wages

The ordinary least squares estimate of the wage equation (Table 4, columns 1 and 2) has a coefficient of -21.16 on the rent-free dummy variable with a t-statistic (against a null-hypothesis that the coefficient is 0) of -1.91. That is, this regression's point estimate is that hourly wages a worker receives is 21¢ lower if that worker receives rent-free housing than otherwise. If the worker were to put in a 47.8 hour work week (as did the average worker who received rent-free housing), then the foregone earnings would equal $10.11 per week.

That estimate, however, is suspect. There is a systematic pattern to which workers receive rent-free housing, as shown above. Thus, since workers are not randomly assigned to such housing, the rent-free dummy's coefficient in the wage equation may suffer from simultaneity bias. A Hausman (1978) test confirms this conclusion. The asymptotic t-test statistic against the null hypothesis of no simultaneity bias is 2.77.

A consistent estimate of the wage equation, employing instrumental variables is shown in columns 3 and 4 of Table 4. A completely different story emerges. The coefficient on the rent-free dummy is 123.35 with an asymptotic t-statistic of 2.21. That is, controlling for the non-random assignment of workers to such housing, a worker that lives in rent-free housing receives a wage that is $1.23 per hour more than that worker would otherwise receive. This differential represents over 30% of the average wage for this group. One possible implica-

tion of this result is that for workers to accept the combined bundle of low-quality housing in an isolated location a higher wage must be offered. That is, the housing may be expensive for employers to provide, but workers do not value it highly, or, at least, dislike some associated feature. An alternative explanation is that workers who accept such housing are more productive (possibly due to proximity to the work).

The other coefficients in the wage equation are generally consistent with most previous studies. Wages increase with age (to a greater extent than usually found). None of the race or gender coefficients are statistically significantly different from zero at the 0.05 level. People who work in crops are paid 38¢ more per hour than others (about 10% more). There is no pronounced seasonality in wages. Higher wages are paid in California and Florida.

Usual Weekly Earnings

As mentioned above, this rent-free housing may be associated with migrant workers who put in long hours in order to earn high weekly paychecks. Living on or near the farm and living in an isolated community with little night life may be conducive to work long hours. An earnings equation is shown in Table 4 (columns 5 and 6) to show the combined wage and hours effects from rent-free housing. This equation is consistently estimated using instrumental variables.[12]

Earnings of workers who receive rent-free housing are $106.98 (asymptotic t-statistic of 3.96) higher than other comparable workers. Had we multiplied the hourly wage differential of $1.23 by the average weekly hours for this group of 47.8, the implied weekly earnings differential would only be $58.79. The rest of the differential is due to the multiplicative effect that workers who live in rent-free housing work longer hours.[13] This $107 differential constitutes more than half of this group's average usual weekly earnings. That is, it appears that these workers, who would otherwise have very low earnings (they are more likely to live in low-wage areas) or who have family responsibilities (they are more likely to be male household heads who are married), choose to take unattractive jobs in which they can earn more money.

CONCLUSIONS

The chief results and conclusions of this study are:

1. Approximately one-quarter of hired agricultural workers live in rent-free housing. This housing is part of an over-all compensation package.

2. Certain demographic groups (the young, the married, males, those with little formal education, and household heads) are more likely to live in such housing. Most of these characteristics are consistent with the view that migrant workers are most likely to live in rent-free housing, but unfortunately this data set does not distinguish migrant from other workers.

3. Workers in California and Florida are less likely to live in such housing than others. Such housing is also less common in the February-May period.

4. Workers who live in rent-free housing are paid *more* than comparable workers. Presumably they are being compensated for living in low-quality housing in isolated areas or are more productive workers. Thus, although the housing itself has some value, the associated problems of such a living style more than off-set that value. Workers who live in rent-free housing also work longer hours so that their weekly earnings are higher than those of other agricultural workers.

Bibliography

California Commission of Housing and Community Development. 1977. *California Farmworkers Housing Assistance Plan, 1977.* California Department of Housing and Community Development.

Chi, Peter S. K. 1986. "Variation in Subjective Well-being Among Black Migrant Farm Workers in New York." *Rural Sociology* 51 (Summer):183-98.

Cronin, Francis J. 1982. "The Household's Decision to Accept or Reject a Conditional Transfer Offer." *Southern Economic Journal* 49 (July):218-34.

Hausman, Jerry A. 1978. "Specification Tests in Econometrics." *Econometrica* 46 (Nov.):1251-71.

Li, Mingche M. 1977. "A Logit Model of Homeownership." *Econometrica* 45 (July): 1081-97.

Margolis, Richard J. 1981. *Homes of the Brave: A Report on Migrant Farmworker Housing.* Rural America for Farmworker Housing Coalition.

Murray, M. P. 1975. "The Distribution of Tenant Benefits in Public Housing." *Econometrica* 43 (July):771-88.

Olsen, Edgar O., and David M. Barton. 1983. "The Benefits and Costs of Public Housing in New York City." *Journal of Public Economics* 20 (April):299-332.

Peck, Susan. 1988. "California Farmworker Housing." Manuscript prepared for the California Institute for Rural Studies.

Rosen, Harvey S. and Kenneth T. Rosen. 1980. "Federal Taxes and Homeownership: Evidence from Time Series." *Journal of Political Economy* 88 (Feb.):59-75.

Sa-Aadu, Jarjisu. 1987. "Participation Behavior and Distributional Consequences Under a Multiple Constrained Housing Program." *Journal of Urban Economics* 22 (Nov.):243-62.

White, Michelle J. and Larry White. 1977. "The Subsidy to Owner-Occupied Housing: Who Benefits?" *Journal of Public Economics* 7 (Feb.):111-26.

Table 1

Summary Statistics

Sample:	Entire		Owners		Rent-Free		Pay Rent	
No. of Obs.:	1785		883		435		467	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Geography								
North Central	0.26	0.44	0.33	0.47	0.20	0.40	0.20	0.40
South	0.33	0.47	0.29	0.46	0.37	0.48	0.35	0.48
West	0.34	0.47	0.29	0.45	0.38	0.49	0.40	0.49
California	0.10	0.30	0.07	0.25	0.06	0.24	0.21	0.40
Texas	0.07	0.26	0.05	0.22	0.11	0.31	0.08	0.27
Florida	0.04	0.20	0.03	0.16	0.02	0.14	0.09	0.28
Demographics								
Age	30.93	14.37	29.82	15.60	32.87	13.45	31.21	12.45
White	0.87	0.34	0.91	0.29	0.85	0.36	0.81	0.39
Female	0.16	0.37	0.21	0.40	0.09	0.29	0.15	0.35
Years of School	11.07	3.52	11.71	2.90	10.64	3.97	10.26	3.89
Hispanic	0.18	0.39	0.11	0.31	0.21	0.41	0.30	0.46
Married	0.47	0.50	0.37	0.48	0.60	0.49	0.53	0.50
Young Child	0.56	0.50	0.58	0.49	0.53	0.50	0.56	0.50
Household Head	0.21	0.41	0.16	0.36	0.25	0.43	0.27	0.45
Industry								
Crops	0.60	0.49	0.57	0.49	0.55	0.51	0.70	0.46
Employment								
Wage (¢)	405.1	203.3	408.9	233.0	389.4	180.3	412.6	158.0
Weekly Hours	41.1	17.6	37.7	18.7	47.8	16.2	41.3	14.7
Weekly Earnings ($)	164.9	101.8	154.2	113.3	179.6	88.8	171.3	87.0

Table 2

Probits on Tenure Status

	Entire Sample Rent-Free		Entire Sample Does Not Own		Non-Owners Rent-Free	
	Coef.	Asymptotic t-stat	Coef.	Asymptotic t-stat	Coef.	Asymptotic t-stat
Geography:						
North Central	0.0178	0.11	-0.0098	-0.07	0.0121	0.06
South	0.2394	1.43	0.0401	0.27	0.3427	1.50
West	0.4186	2.61	0.2470	1.73	0.3975	1.84
Calif	-0.8050	-5.16	-0.0002	0.00	-1.0185	-5.66
Texas	0.2241	1.42	0.3638	2.34	-0.0540	-0.27
Florida	-0.7116	-3.33	0.2700	1.52	-1.0970	-4.45
Demographics:						
Age	0.0298	2.00	0.0370	2.64	0.0169	0.87
Age Squared	-0.0005	-2.65	-0.0007	-4.25	-0.0001	-0.50
Married	0.5951	6.39	0.7127	8.37	0.1361	1.14
White	-0.0713	-0.61	-0.4023	-3.63	0.2079	1.42
Female	-0.9070	-6.99	-0.8959	-8.28	-0.4683	-2.83
Years of School	-0.0400	-3.09	-0.0586	-4.81	-0.0085	-0.52
Hispanic	-0.0043	-0.03	0.2674	2.13	-0.0882	-0.52
Young Children	-0.1353	-1.70	-0.1734	-2.39	-0.0540	-0.52
Household Head	0.6127	5.53	0.8144	7.90	0.1502	1.10
Industry:						
Crops	-0.1760	-2.34	0.0577	0.82	-0.3394	-3.38
Season:						
January	0.0244	0.14	-0.1077	-0.60	0.1617	0.70
February	-0.3945	-2.08	-0.1183	-0.65	-0.3755	-1.62
March	-0.5724	-3.01	-0.3509	-1.99	-0.5456	-2.34
April	-0.3967	-2.28	-0.4338	-2.59	-0.2865	-1.34

May	-0.3070	-1.84	-0.3246	-2.01	-0.1915	-0.91
June	-0.2286	-1.40	-0.2711	-1.71	-0.0772	-0.38
July	0.1054	0.67	-0.1430	-0.92	0.2425	1.23
August	-0.2959	-1.84	-0.5491	-3.52	-0.0420	-0.20
September	-0.2268	-1.32	-0.2679	-1.60	-0.1245	-0.57
October	-0.1604	-0.95	-0.2512	-1.52	-0.0004	-0.00
November	-0.2670	-1.53	-0.2119	-1.25	-0.1660	-0.76
Constant	-0.6493	-1.77	0.4983	1.46	0.3238	0.67
Log-Likelihood	-915.7		-1043.7		-558.7	
Likelihood Ratio						
Test with 27 d.f.	220.5		386.9		131.8	
Pseudo-R^2 measures:						
Maddala	0.12		0.19		0.14	
Cragg-Uhler	0.17		0.26		0.18	
McFadden	0.11		0.16		0.11	
Chow	0.12		0.20		0.13	

Prediction Success Table:

		Actual					
		0	1	0	1	0	1
Predicted	0	1300	379	597	253	299	138
	1	50	56	286	649	168	297
Percentage of Correct Predictions		0.76		0.70		0.66	

Table 3

Differences in Probabilities (%)

(Evaluated at the Means)

Model:	Simple	Preferred		
Sample:	all	all	nonowners	all
Difference in Probability:	rent-free	not owned	rent-free	rent-free
Married (vs. nonmarried)	21.73	24.66	3.93	22.14
White (vs. non-white)	-2.65	-13.11	6.37	5.36
Male (vs. female)	27.55	34.07	15.11	33.54
Hispanic (vs. non-Hispanic)	-0.16	9.07	-2.61	5.21
Household Head (vs. not)	-6.31	2.03	-10.55	-5.75
20 years old (vs. 31)	1.39	-0.21	-3.54	-2.58
40 years old (vs. 31)	-1.87	-4.17	2.46	-1.71
8 years of school (vs. 12)	5.96	8.05	0.98	7.06
11 years of school (vs. 12)	1.45	2.10	0.25	1.82
16 years of school (vs. 12)	-5.56	-8.90	-1.00	7.57
Crops (vs. noncrops)	21.61	29.33	4.40	25.81
West (vs. East)	15.71	8.79	10.55	14.31
Florida (vs. East)	-13.88	10.86	-27.94	-12.59
Texas (vs. East)	17.50	13.77	8.04	16.68
California (vs. East)	-11.74	8.79	-12.63	-9.73
March (vs. December)	-20.15	-11.83	-17.79	-21.29

Notes: The difference in the probabilities is the probability evaluated at the sample mean with the variable set at the level shown minus the probability at the sample mean with the variable set at the level in the parentheses. The probabilities at the means are (respectively): 34.12%, 68.48%, 78.86%, and 54.00%.

Table 4

Hourly Wages (¢) and Usual Weekly Earnings ($) Regressions

	Wage (OLS)		Wage (IV)		Earnings (IV)	
				Asymptotic		Asymptotic
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
Geography:						
North Central	23.255	1.18	23.892	1.15	22.529	2.25
South	-16.535	-0.78	-24.621	-1.10	-18.142	-1.68
West	47.316	2.32	30.088	1.35	22.582	2.09
Calif	95.722	4.78	128.520	5.28	55.793	4.73
Texas	29.259	1.32	20.158	0.86	24.677	2.18
Florida	40.845	1.60	65.727	2.33	13.682	3.36
Demographics:						
Age	11.831	7.03	8.425	3.86	10.216	1.06
Age Squared	-0.120	-2.65	-0.079	-2.88	-0.114	-8.06
White	26.024	1.63	29.463	1.76	14.913	1.84
Female	-11.817	-0.94	8.173	0.54	-38.755	-5.27
Years of School	10.040	6.25	11.999	6.47	7.236	8.06
Hispanic	-9.315	-0.51	-10.358	-0.54	3.512	0.38
Industry:						
Crops	29.905	10.05	38.237	3.48	14.030	2.64
Season:						
January	-5.047	-0.20	-2.570	-0.10	-1.075	-0.08
February	26.644	1.03	47.121	1.67	20.490	1.50
March	39.750	1.59	63.315	2.29	22.211	1.66
April	-1.633	-0.07	15.474	0.60	12.992	1.04
May	-14.900	-0.64	0.661	0.03	10.808	0.90
June	-9.626	-0.43	1.775	0.07	7.502	0.64
July	-3.872	-0.17	-6.729	-0.29	12.022	1.07
August	-16.687	-0.76	-2.219	-0.09	9.058	0.79

September	-1.773	-0.07	9.902	0.39	6.840	0.55
October	-13.666	-0.58	-2.755	-0.11	1.089	0.09
November	-1.357	-0.06	11.558	0.45	14.314	1.14
Rent-Free	-21.160	-1.91	123.350	2.21	106.980	3.96
Constant	-0.649	-1.77	-9.039	-0.19	-166.640	-7.33
R^2 (between observed and predicted)	11.90		6.34		16.43	

Number of observations = 1785

FOOTNOTES

[1] There exists a substantial literature on choosing between owned and rented housing, however, such as Li (1977), White and White (1977), and Rosen and Rosen (1980). Apparently only a nontechnical literature on agricultural housing exists, including California Commission of Housing and Community Development (1977), Margolis (1981), Peck (1988). There are, however, studies of the effects of providing free or subsidized public housing in urban areas on housing choice, including Murray (1975), Cronin (1982), Olsen and Barton (1983), and Sa-Aadu (1987). These studies determine the conditions under which the urban poor will accept subsidized housing, and hence are analogous to the decisions of agricultural workers to accept rent-free housing.

[2] Migrant housing is often of very low quality, as illustrated in examples in Peck (1988). For example, in 1985, California Rural Legal Assistance successfully brought suit against a Monterey County, California strawberry grower who housed two to five workers in hand-dug burrows. It is unlikely, however, that our data set includes such extreme examples. The Department of Housing and Urban Development's *Annual Housing Survey* finds that 52% of vacant migrant worker housing consists of one room, one-third of which has complete plumbing, while 28% had no heating. One survey of employers cited by Peck (p. 20) concluded that "growers providing housing are three times more likely to hire the same workers than growers who do not provide housing." Hence migrant

workers may have a greater tendency to accept such bundles of wages and housing to insure continued employment.

[3] William Greene's LIMDEP program was used to estimate this and other sample selection models. Kenneth J. White's SHAZAM program was used to calculate the probit summary statistics and for the instrumental variable estimates.

[4] Alternatively, an endogenous switching equation technique could be used. Experiments with such a model produced basically similar results, however, in some cases the estimated variance was outside the plausible range. As a result, only instrumental variables estimates based on the housing equations, are reported below.

[5] The data set includes the worker's wage, usual weekly hours worked for the survey week, whether the worker is a supervisor, and whether the individual works in crop or noncrop agriculture. It does not contain detailed information on the worker's agricultural occupation (such as sprayer or harvester). Work with other agricultural data sets (such as in Frisvold, Mines, and Perloff, 1988), however, do not show significant wage differentials across agricultural occupations and industries. The state and urban versus nonurban location of the housing is reported. A great deal of information is provided about urban location for major cities, but the only detail for nonurban housing is whether it is on a farm. In the survey used, data on the quality of housing is not included. Unfortunately, the CPS does not indicate whether workers are

migrants. Further, it does not report on multiple housing units owned, but only on the one the individual is living in at the time of the survey. It seems likely that people who live in substandard housing are less likely to be surveyed and workers in the country illegally may be less likely to respond.

[6] To allow for seasonal effects, workers surveyed in all months are included. Only one, randomly chosen, observation for each worker is included for those workers included more than once in the survey year.

[7] This result is consistent with those of the California Commission of Housing and Community Development (1977), which found that in 1976, most of the 216,000 hired farmworkers in California lived permanently in one location. They estimate (p. 2) that 50,000 to 80,000 workers, "often accompanied by children, follow the crops for 6 to 9 months each year" and live in "labor camps, old barns, automobiles, and other types of shelters."

[8] Because only agricultural workers who are employed are included in the sample and "usual hours" are used, both wages and hours are bounded away from zero. Usual hours have lower variance than actual hours.

[9] The correlation between the two equations was only -.00000005 with a standard error of 1.04. That is, failing to control for sample selection would have produced the same results. Thus, being careful here had better be its own reward.

[10] It has been argued that the quality of housing affects one's welfare or self-esteem directly. Chi (1986) finds that the subjective well-being black

migrant farm workers in New York varied with housing conditions (as well as life-style, social support, age, sex, and eduction). He used three housing variables: home ownership (versus renting) in the home community, living in a substandard housing unit in the home community, and living a substandard housing unit in the migrant community. He finds that homeowners usually occupy better housing units and have a higher degree of self-esteem than renters. As expected, owners and those not living in substandard housing had higher levels of well-being (but the results were not statistically significant at the 0.05 level).

[11] Only the preferred model's equations are reported since the simpler model produces virtually identical results. The probability of living in rent-free housing is used as an instrument.

[12] Estimating this equation by ordinary least squares, the coefficient on the rent-free dummy variable is 7.08 with a t-statistic of 1.29. The Hausman test statistic of simultaneity is 4.19, so again we reject the hypothesis that this variable is exogenous.

[13] A usual-weekly-hours equation, estimated using instrumental variables, has a coefficient on the rent-free variable of 19.288 (asymptotic t-statistic of 4.24). The hours equation is not presented in Table 4 because the hours-worked effect is implicitly captured in the earnings equation.