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AMONG CALIFORNIAN AND OTHER U. S. AGRICULTURAL WORKERS

by

Jeffrey M. Perloff

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Union and Demographic Wage, Hours, and Earnings Differentials  
Among Californian and Other U. S. Agricultural Workers

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**Union and Demographic Wage, Hours, and Earnings Differentials**  
**Among Californian and Other U. S. Agricultural Workers**  
Jeffrey M. Perloff

This study shows that Californian agricultural production workers' wages, weekly hours, and weekly earnings differ from those of workers elsewhere. The returns to being a union member, while substantial in California, are much lower than elsewhere. There are also differences in California for various demographic groups, foremen, and managers.

In this study, union and demographic variations in wage and hours of agricultural production workers are used to explain earnings differentials. Wage and income differentials between various demographic groups of agricultural workers and between agricultural workers and workers in other industries are cited as justification for various Californian and federal government programs (such as price supports, payment-in-kind, marketing orders, and labor relations acts). Yet little has been known about how wages, hours, and earnings differ across agricultural workers of various demographic and union status characteristics.

Unlike most previous studies, this one is based on a random sample of individual workers and calculates wage and hours differentials adjusting for variations in education, experience, and other personal characteristics. Special attention is paid to union and other demographic differences among workers and to the difference between workers in California and elsewhere.

This paper is divided into seven parts. First, a brief survey of the literature is presented. Next, summary statistics show how union and nonunion Californian and U. S. agricultural production workers' demographic and economic characteristics dif-

fer. In the third section, Californian wage, hours, and earnings differentials are calculated for union and demographic characteristics (holding other personal attributes constant). Fourth, wage, hours, and earnings differentials in the rest of the country are compared to those in California. Next, agricultural workers are compared to workers in other industries. In the sixth section, family incomes of various agricultural groups are compared. The paper ends with a summary and conclusions.

### I. A Brief Survey of the Literature

Very little is known about the determinants of wage, weekly hours, and weekly earnings differentials in the agricultural production sectors across the U. S. or in California. Several good institutional studies of these markets present some summary statistics (see, for example, Mines and Martin, Martin and Rochin, Huffman, Mamer, and Hayes) and theoretical discussions (Ladd on unions). Most detailed empirical studies to date, however, relied on aggregate data, and hence were unable to study variations in wages or other variables based on individual differences.

These aggregate studies of agricultural labor markets examined the responsiveness of demand and supply to wages (Schuh); the markets for hired labor, unpaid family labor, and operator labor differences (Tyrchniewicz and Schuh); the effects of schooling on wages and labor supply (Gisser); and the interaction of schooling and minimum wage laws on farm wages and employment (Gallasch and Gardner). To my knowledge, the only published study that used a random sample data set based on individuals was one by Scott, Smith, and Rungeling, which estimated wage differentials and labor force participation probabilities based on individuals' characteristics for four Southern rural counties.<sup>1</sup>

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<sup>1</sup>See, however, Richard Mines's paper in this conference volume.

Thus, so far as I have able to determine, there have been no empirical studies on union differences using either aggregate or individual data for any geographic region. Nor do there appear to be any studies which have estimated differences in hours worked per work according to individual characteristics and hence no studies which have explained weekly earnings differences on the basis of these wage and hours effects. Except for the study by Scott, Smith, and Rungeling, there appear to be no studies based on individual data and hence none for California or for the U. S. as a whole.

## II. An Overview of California and U. S. Agricultural Production Workers

One under-utilized source of information about agricultural production workers is the U. S. Bureau of the Census's annual May Current Population Survey (CPS). This survey of tens of thousands of individuals throughout the U. S. contains a wealth of information on demographic and economic characteristics. As individuals are chosen by geographic location, the survey includes non-citizens. This paper is based on the surveys for the years 1974, 1976, and 1978.<sup>2/</sup> In the wage and hours studies reported below, the sample was restricted to agricultural production workers only (individuals in horticulture and agricultural services were excluded). For those studies, farmers and unpaid family workers do not receive weekly remuneration were also excluded.

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<sup>2</sup>More recent data were not available to me at the time this paper was written. The surveys through 1972 contain almost none of the interesting economic variables, so they were excluded. The odd-numbered years were not included because individuals were included in the CPS sample for two successive years so that everyone in the intervening odd-numbered years is also contained in the even-numbered years.

To obtain an impression of the data, we start by examining some aggregate figures. Table I shows the 1978 demographic composition of unionized and nonunionized workers.<sup>3/</sup> The key differences can be summarized as follows:

1. A higher percent of nonunionized Californian agricultural production workers are female than are nonunionized workers in the country as a whole (27.6 percent versus 15.5 percent). Among unionized workers, however, a higher percent are female in the country as a whole than in California.<sup>4/</sup>
2. Twenty percent more unionized workers in both California and the U. S. as a whole are married and living with that spouse than are nonunionized workers.
3. In the country as a whole, unionized workers are less likely to be white or black than are nonunionized workers, while all other racial groups (collectively) are more likely to be unionized than not.
4. A much higher percent of workers are Hispanic in California than in the rest of the country.<sup>5/</sup> In both California and the rest of the country unionized workers are more likely to be Hispanic than are nonunionized workers.

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<sup>3</sup>Notice that some of the groups are relatively small (especially union workers in California) so that these figures should be viewed with caution.

<sup>4</sup>It should be stressed again, however, that the figures for the unionized California group should be viewed with particular caution due to the small sample.

<sup>5</sup>The Hispanic citizens group in Table I represents individuals who described themselves as "Mexican American," "Chicano," or "Puerto Rican." Others from countries where Spanish is spoken (e.g., "Mexican") were put in the noncitizens group. This division may not be completely accurate.

Table 1  
 Demographic Characteristics of Unionized and Nonunionized  
 Agricultural Production Workers  
 Based on the May 1978 Current Population Survey Data  
 (Percents)

	California		United States		
	Union	Nonunion	All	Union	Nonunion
Female	16.7	27.6	16.8	20.8	15.5
Married, Living Together	83.3	63.2	45.9	79.2	46.0
Race:					
White	100.0	92.0	85.3	50.0	86.4
Black			11.1	4.2	11.6
Other		8.1	3.6	45.8	2.0
Hispanic:					
U. S. Citizens	83.3	69.0	17.8	25.0	16.3
Noncitizens		19.5	5.8		5.7
	83.3	49.4	12.0	25.0	10.6
Industry:					
Production	100.0	96.6	96.6	100.0	96.7
Horticulture		3.5	3.4		3.3
Paid on an Hourly Basis	33.3	69.2	51.3	81.8	50.3

Note: Maximum samples sizes for the columns are 6, 87, 862, 24, and 785, respectively. Note: Hispanics who are classified as U. S. Citizens includes those individuals who described themselves as "Mexican American," "Chicano," and "Puerto Rican." The noncitizens group included others (e.g., "Mexican"). This division may not be completely accurate.



5. In California, unionized workers are half as likely to be paid on an hourly basis than are nonunionized workers; while in the country as a whole, unionized workers are more likely to be paid on an hourly basis than are nonunionized workers (81.8 percent versus 50.3 percent).

Table 2 shows the mean values of a number of variables for unionized and non-unionized workers. Some of the key differences between the groups are:

1. In California, unionized workers' usual earnings per hour (henceforth, "wage" for simplicity) are 83.4 percent more than those of nonunionized workers; while in the country as a whole, unionized workers earn 105.9 percent more than nonunionized workers.<sup>6/</sup>
2. In California, unionized workers' weekly earnings are 68.0 percent higher than nonunionized workers; while the union "markup" on earnings is 101.7 percent in the country as a whole. That is, the union markup over nonunion weekly earnings is less than the hourly earnings markup.
3. The reason for this difference is that unionized workers work 3.8 fewer hours (-8.1 percent) than nonunionized workers in California and 2.3 fewer hours (-5.3 percent) in the U. S. as a whole. These differences apparently are due to the length of the work day since both unionized and nonunionized individuals have roughly equal length work weeks (though the work week is slightly longer on average in California than elsewhere).
4. Both in California and elsewhere, unionized workers have less formal education than nonunionized workers.

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<sup>6</sup>The usual hourly earnings are calculated by dividing the usual weekly earnings by the usual weekly hours. Thus, an hourly variable is obtained even for workers who are not paid on an hourly basis.

Table 2  
 Summary Statistics for Unionized and Nonunionized Workers  
 Based on the May 1978 Current Population Survey Data  
 Means and (Variances)

	California		United States		
	Union	Nonunion	All	Union	Nonunion
Usual Hourly Earnings (\$)	6.16 (37.3)	3.34 (1.2)	2.78 (37.2)	5.55 (11.6)	2.69 (32.5)
Usual Weekly Earnings (\$)	254.67 (4803.3)	151.59 (4551.9)	115.02 (5798.1)	224.95 (1742.4)	111.51 (5055.0)
Usual Weekly Hours	42.67 (15.1)	46.43 (203.0)	43.69 (421.9)	41.41 (14.3)	43.75 (434.1)
Actual Hours this Week	35.83 (129.8)	44.18 (345.1)	38.89 (612.5)	38.79 (117.8)	41.63 (557.7)
Days Worked per Week	5.67 (0.3)	5.78 (0.7)	5.44 (2.1)	5.32 (0.2)	5.45 (2.2)
Children in Home	1.50 (1.1)	1.53 (2.7)	1.66 (3.4)	1.57 (2.4)	1.63 (3.5)
Years of School	7.67 (25.9)	8.02 (14.2)	9.36 (12.5)	7.80 (22.5)	9.46 (12.0)
Years of Experience	18.67 (159.1)	19.22 (227.5)	17.36 (339.1)	29.38 (285.4)	17.37 (342.3)
Age	32.34 (122.3)	33.24 (195.8)	32.66 (283.6)	43.17 (213.9)	32.74 (287.9)

Note: Maximum samples sizes for the columns are 6, 87, 862, 24, and 785 respectively. Note, the "All" U. S. column represents more workers than the "Union" and "Nonunion" columns since not all individuals answered the union status question.

5. In California, unionized workers have slightly fewer years of experience than nonunionized workers; while in the rest of the country, unionized workers have 12 more years of experience than nonunionized workers.<sup>7/</sup> The ages follow a similar pattern.<sup>8/</sup>

6. Unionized workers in California earned more per hour than did unionized workers in the country as a whole (\$6.16 versus \$5.55). Similarly, nonunionized workers in California earned more than their counterparts elsewhere (\$3.34 versus \$2.69).

### III. Californian Wage, Hours, and Earnings Differences by Union Status and Demographic Characteristics

The summary statistics clearly show that union workers work different weekly hours and make different hourly and weekly earnings than do nonunion workers. Similar summary statistics show differences according to various demographic characteristics (race, sex, ethnicity, and so forth). These summary statistics may be quite misleading, however.

As Tables 1 and 2 show, union workers have different characteristics than do nonunion workers. They differ according to age, experience, education, and other demographic characteristics. As a result, comparisons of average union hourly earnings with nonunion ones may reflect wage differences that can be attributed to other factors than union market power.<sup>9/</sup>

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<sup>7</sup>Experience is defined as age minus years of school minus six. That is, experience is the number of years since the individual finished school. It does not necessarily follow that the individual worked exclusively in agriculture during that period.

<sup>8</sup>Based on these averages, it appears that these agricultural workers started working sometime between ages 13 and 15.

<sup>9</sup>Our data set does not report the crop or a worker's occupation (beyond "laborer," "foreman," or "manager"). As a result, some of the differences in economic varia-

Statistical techniques (e.g., multivariate regression) can be used to estimate the effect of unions (or other demographic characteristics) on economic variables holding other characteristics of individuals constant. These statistical techniques can be used to estimate how much more a given individual (with a given level of experience, education, and so forth) would earn in the union versus the nonunion sectors. Thus, we can calculate the wage differentials due to union power alone.

Multivariate regression allows us to calculate, for example, the effect of union status on, say, wages, holding other characteristics of individuals constant (e.g., union members with a given level of experience and education are compared to nonunion workers of a comparable level of experience and education). This statistical technique also allows us to test whether this estimated difference is "statistically significant," or whether it could be due to chance (that is, would a different sample of union and nonunion workers produce different results?). Thus, in examining the results of the multivariate regression, we must distinguish between effects which are statistically significant (i.e., unlike to be due solely to chance) and those that are significant or large in the usual sense.

The appendix to this paper discusses the technical issues and presents the multivariate regression results. In this section, the results are summarized. We start by considering a base group to which all other groups will be compared. Members of the base group are nonunion, white, nonhispanic, male laborers with the average

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bles reported here may be due to crop-specific or occupation-specific factors which we are not properly measuring. Moreover, fringe benefits are not included. As a result, the difference between union and nonunion workers' earnings inclusive of fringe benefits are unestimated below.

amounts of experience (20.363 years) and education (7.996 years of school).<sup>10/</sup> The estimated usual hourly earnings, usual weekly hours, and usual weekly earnings for this group in 1974 are \$3.09, 44.2 hours, and \$136.43.

If an individual had the same characteristics as members of this base group, but was a union member, his wage would be 38 percent higher (\$4.26). He would work slightly fewer hours (the estimate of 4.2 fewer hours per week was not statistically significantly different from zero), so his weekly earnings would be 25 percent higher than those of a comparable nonunion worker.

Demographic differences also occur. Females earn the same wage as men but work 9.1 fewer hours per week so that their weekly earnings are 23.1 percent less. Though Hispanics have lower wages than other workers, they work more hours per week so that they earn more per week. Hispanics who are U. S. citizens (noncitizens) have 13.2 (14.7) percent lower wages, work 9.2 (12.1) more hours week, and earn 4.6 (8.9) percent more than nonhispanics. Similarly, nonwhites have the same wages, but work 7.2 more hours per week and earn 16.1 percent more per week than whites.

Californian foremen's hourly earnings are not statistically significantly higher than laborers', but foremen work 12.4 more hours per week, so that they earn 22.0 percent more than laborers. In contrast, managers's hourly earnings were 63.4 percent higher than laborers', but they worked 6.2 fewer hours per week, so that their weekly earnings were 42.8 percent higher.

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<sup>10</sup>Note that these means differ slightly from those reported in Table 2 since the sample used in this part of the study is restricted to those individuals for which none of the key variables are missing.

Additional education was associated with higher wages and hours. A one percent increase in years of education (at the sample mean) raised wages by 4.6 percent and weekly hours by 1.9.<sup>11/</sup>

Several earlier studies estimated the effect of education on wages. Using aggregate, cross-sectional data (from 1950 and 1960), Gisser calculated that a one year increase in the average number of years per schooling in a State would raise the average wage in that State by approximately 10 percent. Based on individual data from four Southern counties, Scott, Smith, and Rungeling estimated that an extra year of schooling would raise one's wage by between 5 and 17 percent (depending on one's race and sex). This study indicates that Californians' wage would increase by 5 percent.<sup>12/</sup> Thus, it appears that the return to education is lower in California than previous studies suggested.<sup>13/</sup>

Additional experience also raised wages and hours. A one percent increase in experience (at the sample mean) raised the wage 0.95 percent and weekly hours by half an hour. To give an idea of the importance of experience someone with only

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<sup>11</sup>The education figures use only the statistically significant education squared coefficient. If the education coefficient were also used, the figures would be 1.9 percent and 0.8 hours.

<sup>12</sup>In this study, an extra year of schooling would raise a Californian's wage by only 2 percent (rather than 5 percent) if the statistically insignificant point estimate on the education term is used as well as the statistically significant coefficient on the education squared term.

<sup>13</sup>Part of the difference between the Scott, Smith, and Rungeling study and this one is that they used a linear-linear wage equation, while this study used a log-linear equation; and they assumed the effect of education on wages was linear, while this study allowed education to have a quadratic effect as well.

10 years of experience would earn 28.1 percent less per week than another worker in our base group (with roughly 20 years of experience); and someone with 30 years experience would earn 13.7 percent more.<sup>14/</sup>

The Scott, Smith, and Rungeling study calculated the effect of age on wages. Since our measure of experience is highly related to age (age minus education minus six), the effects of age and experience might be expected to be quite similar. In their study, an increase in age of one year from 34 (the mean of our sample) would increase the wage of the average household head by about 2 percent. In this study, a one year increase in experience (from the mean of 20) would increase the wage by about 1 percent.

The hours usually worked per week in 1976 and 1978 were not statistically significantly different from those worked in 1974. In 1976, workers' wages were not statistically significantly different than in 1974. Their wages in 1978, however, were 28.4 percent higher.

#### IV. A Comparison of Californian to Other U. S. Agricultural Production Workers

By analyzing data from the entire U. S. agricultural production sector, we can compare wages, hours, and earnings of Californians to workers elsewhere.<sup>15/</sup> The following results were obtained:

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<sup>14/</sup>It is quite possible that more experienced or more educated laborers work on different crops and have different occupations than other laborers. Unfortunately, our data set do not let us control for crop or occupation more finely than the classification shown in the regression results.

<sup>15/</sup>See the appendix.

1. Nationally, union workers earn nearly 62.5 percent higher wages than do nonunion workers, holding other factors constant. They do not differ in hours worked from nonunion workers, so their weekly earnings are also comparably higher.<sup>16/</sup>

2. Nationally, holding other factors constant, there is no difference between the wages, hours, or weekly earnings of white agricultural workers and nonwhite or Chicano (or Mexican American) workers. There is also no difference in wages between U. S. citizens and Hispanics who are not U. S. citizens.

In contrast, Californian Hispanics who are not U. S. citizens work 11.5 hours more per week than do other workers (resulting in nearly 22.5 percent higher weekly earnings).<sup>17/</sup> Outside of California, however, this group works the same number of hours as other workers.

3. Both in California and in the rest of the nation, females are paid the same wage as males. They do, however, work many fewer hours. In California, females work about 9.1 fewer hours per week than do men, so that females' weekly earnings are 13.8 percent less than those of men. Nationally, females work nearly 16 fewer hours per week, so that they earn 30.5 percent less per week.

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<sup>16</sup>Probably due to the relatively small number of Californian union members in our U. S. sample, we can not measure the difference between the national union markup and the Californian union markup very precisely. The difference is not statistically significant at the 0.10 level (t-statistic = -1.01). The "point estimate," however, suggests that the Californian union markup may only be about 35.4 percent (compared to the national figure of 62.5 percent). This estimate, 35.4 percent, is close to the number based on the California-only regression, 38.0 percent.

<sup>17</sup>The percent differences in wages and earnings and the hours differences for Californians differ slightly from the numbers reported above. These slight difference are due to the differences in the regression estimates between the California-only sample and the national sample of agricultural production workers.



4. Nationally, foremen earn wages which are 23.8 percent more than laborers'.<sup>18/</sup> Since foremen work almost the same number of hours as do laborers, their weekly earnings markup is nearly as high as the wage markup: 20.2 percent.

In California, foremen work 14 hours more per week than do laborers. Thus, even if their wages were the same as laborers, Californian foremen would earn 18.5 percent more per week.

5. Nationally, managers do not earn higher wages than do laborers. They tend to work nearly 7.8 hours more per week, however, so their weekly earnings are nearly 15 percent higher than laborers'.

In California, managers earn much higher wages than laborers (though we cannot measure the difference very precisely based on this regression). Californian managers tend to work about 6.2 hours less per week than laborers, however, so that their weekly earnings are about 40.8 percent more than laborers'.

6. There are large regional differences in wages, hours, and earnings. Workers in the West (excluding California) earn more per hour than agricultural production workers elsewhere. The lowest wages are in the South. Most Southern workers earn 16.2 percent less than workers in the West. Workers in Florida, however, earn 11.3 percent more than Western workers.

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<sup>18</sup>The difference between the national foreman wage markup and the Californian markup is not statistically significant at the 0.10 level (t-statistic = -1.35). The point estimate, however, suggests that Californian foremen may not make more than laborers (the same result obtained in the California-only regression).

Most Southerners also work 3.2 fewer hours per week than do workers elsewhere. As a result, they earn 21.2 percent less than Western workers. Because Floridians earn more than most Southerners (although they work roughly the same number of hours), their weekly earnings are 4.0 percent more than western workers. Texans earn roughly the same as other Southern workers, but work 3.1 hours more per week than Western workers, so that Texans earn 11.2 percent less per week than do Westerners.

7. Californians earn more per hour than other agricultural workers, but work the same number of hours per week. Californians had hourly and weekly earnings which were about 47.4 percent more than those of other workers.<sup>19/</sup>

8. During the mid-1970s, agricultural wages rose substantially, while weekly hours worked remained relatively constant over time. Wages (and weekly earnings) were 19.3 percent higher in 1976 than in 1974 and 32.6 percent higher in 1978 than in 1974.<sup>20/</sup>

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<sup>19</sup>The Californian wage markup over other workers is statistically significant at the 0.10 level (t-statistic = 1.89). That suggests that this markup is not measured very precisely, so that the actual markup may be somewhat larger or smaller. Of course, to the degree that Californian workers differ in individual characteristics from other workers, the markup will differ for these reasons as well, as discussed above.

<sup>20</sup>Wage changes in California were not statistically significantly different from those in the rest of the country. Nonetheless, the point estimates were somewhat lower (especially in 1976), which may indicate that Californian wages did not rise as much as in the rest of the country. The California-only regression also indicates that wages did not rise from 1974 to 1976.

## V. A Comparison of Agricultural Workers' Wages and Hours to Other Workers

Using a representative sample of the entire CPS data set, I also calculated the wage and hours differentials between those in agriculture and others.<sup>21/</sup> The results of these comparisons confirm most people's expectations. Agricultural workers receive substantially lower wages than others and work longer hours.

Agricultural workers' (including those in horticulture and in agricultural services) wages are 18.3 percent lower than those of workers in other industries, controlling for education, experience, demographic characteristics, occupation, local unemployment conditions, and location.<sup>22/</sup> There is no statistically significant wage differential between agricultural production workers and other agricultural workers (in horticulture and in services).

Agricultural production laborers, foremen, and managers as a group work 11.9 hours more than other workers, controlling for the same factors as mentioned above. Other agricultural workers, however, do not work more hours than other workers. Since agricultural production workers earn less per hour and work substantially more hours, their weekly earnings (at least in May) do not differ significantly from those in other industries.

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<sup>21</sup>A random, one-in-ten, sample of the 1978 May CPS data set was used for the calculations reported below. The regressions upon which this section is based will be reported in a forthcoming paper.

<sup>22</sup>This wage differential is statistically significant at the 0.05 level.

## VI. How Farmers' Incomes Compare to those of other Agricultural Workers

In the study reported above, farmers were not included. They were excluded because farmers (and unpaid family workers do not typically report either weekly or hourly earnings). Some feeling for how farmers' earnings compare to those of other agricultural workers can be obtained by examining individuals' self-reported family incomes.<sup>23/</sup>

The CPS asks individuals to report their annual incomes by category (as opposed to reporting an exact dollar amount). Table 3 shows the distribution of family incomes of farmers, unpaid family workers, managers, foremen, and laborers in the May 1978 CPS survey of the U. S. agricultural production industry. Table 4 shows the corresponding distribution for Californians alone.<sup>24/</sup>

Based on a superficial comparison of the various columns of Table 3 it does not appear that farmers, unpaid family workers, managers, and foremen earn substantially higher incomes than laborers. During that period, however, farmers and their families may have benefitted from substantial capital gains on their farms (which is not reported as income), unlike the other group.

Some farmers and unpaid family workers had very high incomes, but a substantial group had very low incomes. For example, 13.9 percent of the farmers and 11.8 percent of the unpaid family workers reported incomes below \$3,000 (only 10.0 percent of the laborers reported incomes this low).

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<sup>23</sup>The incomes reported here are from all sources (including from capital and other nonagricultural earnings).

<sup>24</sup>Managers are excluded from Table 4 since there was only one manager in the 1978 sample. Because of relatively small samples (especially unpaid family workers, foremen, and union laborers), the Californian distribution should be viewed with some caution.

Table 3  
 Income Distribution  
 U. S. Agricultural Production Farmers and Workers  
 May 1978 CPS Data  
 (Percent of Group in Each Income Category)

Family Income	Farmer	Unpaid Family Worker	Manager	Foreman	Laborer	Union Laborer	Nonunion Laborer
Under \$1,000	6.54	6.76			2.52		2.78
\$1,000-1,999	1.94	1.01			3.66		2.78
\$2,000-2,999	5.39	4.05			3.78		3.89
\$3,000-3,999	5.30	4.39		3.45	6.31		6.54
\$4,000-4,999	4.24	5.41	5.56		6.94		6.82
\$5,000-5,999	7.60	5.74	2.78	3.45	6.94	4.55	7.23
\$6,000-7,499	6.36	7.09	8.33	6.90	9.46	13.64	9.60
\$7,500-9,999	10.60	6.76	5.56	31.03	12.86	13.64	12.80
\$10,000-11,999	10.16	9.12	22.22	6.90	10.21	4.55	10.71
\$12,000-14,999	9.89	9.46	16.67	10.34	9.84	13.64	9.60
\$15,000-19,999	11.57	10.81	13.89	13.79	10.21	18.18	10.15
\$20,000-24,999	8.30	11.49	13.89	3.45	6.94	9.09	6.68
\$25,000-49,999	8.48	13.85	11.11	20.69	8.07	22.73	7.93
\$50,000 plus	3.62	4.05			2.27		2.50
Sample Size	1132	296	36	29	793	22	719

Table 4  
 Income Distribution  
 Californian Agricultural Production Farmers and Workers  
 May 1978 CPS Data  
 (Percent of Group in Each Income Category)

Family Income	Farmer	Unpaid Family Worker	Foremen	Laborer	Union Laborer	Nonunion Laborer
Under \$1,000	4.76					
\$1,000-1,999	4.76					
\$2,000-2,999		12.50				
\$3,000-3,999			14.29	1.25		1.35
\$4,000-4,999	9.52	25.00		11.25		12.16
\$5,000-5,999	4.76	12.50		6.25	16.67	5.41
\$6,000-7,499				16.25	33.33	14.86
\$7,500-9,999	19.05		42.86	18.75	33.33	17.57
\$10,000-11,999	4.76	25.00		10.00		10.81
\$12,000-14,999			14.29	8.75		9.46
\$15,000-19,999	28.57		14.29	15.00		16.22
\$20,000-24,999	4.76	12.50		5.00		5.41
\$25,000-49,999	14.29	12.50	14.29	6.25	16.67	5.41
\$50,000 plus	4.76			1.25		1.35
Sample Size	21	8	7	80	6	74

Note: There was only one manager in this sample.

Union laborers, however, do appear to have higher incomes than nonunion laborers. For example, over one fifth of the sample of union workers reported family incomes over \$25,000 in 1978 compared to half as many nonunion workers.

No managers, foremen, and union laborer reported very low incomes (unlike farmers, unpaid family workers, and nonunion laborers). The peak of the managers' income distribution occurs in the \$10,000 - \$11,999 range (22.2 percent of the managers had incomes in this range), but over half the managers had higher incomes. There are two peaks in the foremen's distribution: one in the \$7,500 - \$9,999 range (31.0 percent) and the other in the \$25,000 - \$9,999 range (20.7 percent). Apparently there are two types of foremen throughout the U. S. One group has a high income while the other only has a moderate income.

Because of the fairly small samples in the Californian sample, it is risky drawing inferences except for the nonunion laborer group. A superficial comparison, however, shows no striking differences between the Californian sample and that of the U. S. as a whole.

## VI. Conclusions

This study has shown that there are substantial differences in wages, hours, and earnings according to demographic characteristics and union status. Moreover, the effects of individual characteristics on these economic variables are different in California than in the rest of the United States.

Of particular importance is the finding that while Californian union workers' wages average 83 percent more than nonunion workers, if we adjust for differences in personal characteristics (such as education and experience), the union wage mark-

up is only 38 percent. In contrast, the union markup for the entire country is 63 percent. Thus, the California union markup, while large, is only 60 percent as large as the national one.

A second key finding is that there is little difference in wages according to sex, race, ethnicity, or citizenship around the country, except Hispanics in California have lower wages. Weekly hours worked vary significantly across demographic group, however. As a result, weekly earnings differ substantially by demographic group. In California, these differences appear to be even more pronounced than in the rest of the country.

Third, foremen and managers fare differently in California than in the rest of the country. In California unlike elsewhere, foremen do not have a significant wage markup over laborers, but work many more hours. While managers elsewhere do not earn more than laborers but work more hours; they earn more in California and work fewer hours.

Fourth, controlling for demographic characteristics, Californians earned more than agricultural workers elsewhere during the 1970s. Wage changes in California, however, were slower than in the rest of the country.

Fifth, agricultural workers received lower wages and worked longer hours than workers in other industries. At least in May, by working more hours per week, agricultural workers compensated for lower wages and earned roughly the same per week as workers in service industries.



### Technical Appendix

Two sets of multivariate regressions are reported in this appendix. The samples for both are drawn from the May CPS tapes for 1974, 1976, and 1978 and include only agricultural production workers who reported usual weekly earnings and hours (i.e., laborers, foremen, and managers, but not farmers and unpaid family workers). The first set of regressions is restricted to Californians only; whereas the second set includes workers from all over the U. S.

Table A-1 presents the coefficients and corresponding t-statistics (against the null-hypothesis that the coefficient equals zero) for the Californian sample. The first two columns are the coefficients and t-statistics are from a regression of the log of the usual hourly earnings ("wage") on demographic and other variables; while the last two columns are from a regression of usual weekly hours on the same variables.<sup>25/</sup>

In the log wage equation, the union, Hispanic (non-citizens), manager, experience, experience squared, education squared, and 1978 dummy coefficients were statistically significant at the 0.05 level. The coefficient on the Hispanic (U. S. citizens) variable was significant at the 0.10 level. The other coefficients (for females, whites, foremen, education, and 1976) were not statistically different from zero. This equation explained 23.5 percent of the variation, which is reasonably high for a cross-section wage equation.

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<sup>25</sup>The equations were initially run using the Box-Cox specification. In the wage equation, the log-linear specification could not be rejected (and had a higher likelihood function than the linear-linear specification). In the hours equation, the linear-linear specification could not be rejected (and it dominated the log-linear specification).

Table A-1  
 Ordinary Least Squares Regressions  
 May 1974, 1976, and 1978 Current Population Survey Data  
 Californian Agricultural Production Laborers, Managers, and Foremen

	Log Usual Hourly Earnings		Usual Weekly Hours	
	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	5.3681	34.00	32.614	5.14
Union	0.3222	2.99	-4.1761	-0.97
Female	-0.0326	-0.50	-9.0893	-3.45
White	0.0018	0.02	-7.2176	-1.84
Hispanic (U.S. Citizens)	-0.1443	-1.90	9.2185	3.02
Hispanic (Noncitizens)	-0.1561	-2.06	12.0960	3.98
Manager	0.5064	2.88	-6.1606	-0.87
Foreman	-0.0481	-0.34	12.3710	2.16
Experience	0.0220	4.31	1.4587	7.11
Experience squared	-0.00031	-3.42	-0.0228	-6.32
Education	-0.0263	-1.17	-1.12	-1.25
Education squared	0.0028	2.07	0.1183	2.16
1976	0.0417	0.63	0.1777	0.07
1978	0.2501	3.92	0.1457	0.06
Adjusted R2		23.47		31.90
Variance of the Estimate		0.14263		229.74
F-Statistic		6.307		9.108
Number of Observations		226		226

In the hours equation, the coefficients on the two Hispanic variables, the female dummy, the foreman dummy, experience, experience squared, and education squared were statistically significantly different from zero at the 0.05 level; while the coefficient on race was statistically significant at the 0.10 level. The other coefficients (on union, manager, education, 1976, and 1978) were not statistically significantly different from zero. The equation explained 31.9 percent of the variation in hours worked.

One could argue that the union, manager, and foreman dummies are endogenous. That is, that ordinary least squares estimates may be biased. To test this hypothesis, probit equations attempting to explain these variables were run, the predicted values of these variables were then obtained and included in the equation, and a Hausman-Wu test of endogeneity was conducted. Based on this test, we cannot reject the null hypothesis of no simultaneity bias.<sup>26/</sup>

Table A-2 reports the corresponding equations for the entire U. S. sample. To test the possibility that Californians have different wage and hours equations than others (i.e., that the slope coefficients differ as well as the intercept), an interactive specification was used where the California dummy was multiplied by each of the demographic and year variables. Chow (F) tests strongly reject the null hypothesis that the Californians have the same wage and hour equations as others.

The pattern of statistically significant variables is largely the same as in the California regressions (except as noted in the text of the paper). The log wage equation explains 22.5 percent of the total variation, while the hours equation explains 29.7 percent.

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<sup>26</sup>These tests will be reported in more detail in a forthcoming paper.

Table A-2  
 Ordinary Least Squares Regressions  
 May 1974, 1976, and 1978 Current Population Survey Data  
 U. S. Agricultural Production Laborers, Managers, and Foremen  
 Coefficients and (t-statistics against zero)

	Log Usual Hourly Earnings		Usual Weekly Hours	
	California Interactions		California Interactions	
Intercept	4.956 (53.14)	0.4120 (1.89)	33.689 (9.91)	-1.0746 (-0.13)
Union	0.4902 (5.09)	-0.1680 (-1.01)	-1.4370 (-0.41)	-2.7391 (-0.45)
Female	-0.02409 (-0.69)	-0.008485 (-0.10)	-15.957 (-12.55)	6.8679 (2.11)
White	0.02271 (0.57)	-0.02088 (-0.16)	2.1329 (1.46)	-9.3506 (-2.00)
Hispanic (U.S. citizen)	0.1140 (1.61)	-0.2583 (-2.18)	3.3240 (1.29)	5.8945 (1.37)
Hispanic (non-citizen)	0.07307 (1.16)	-0.2292 (-2.01)	0.6040 (0.26)	11.492 (2.77)
Manager	0.1188 (1.59)	0.3875 (0.23)	7.8375 (2.87)	-13.998 (-1.65)
Foreman	0.2169 (2.64)	-0.2651 (-1.34)	-1.6437 (-0.55)	14.015 (1.96)
Experience	0.01608 (6.92)	0.005941 (0.87)	1.5632 (18.46)	-0.1044 (-0.42)
Experience squared	-0.000241 (-5.51)	-0.000067 (-0.55)	-0.02608 (-16.38)	-0.00328 (0.74)
Education	-0.02083 (-1.38)	-0.005509 (-0.17)	-2.0546 (-3.73)	0.9311 (0.80)
Education squared	0.003325 (4.09)	-0.000504 (-0.27)	0.1882 (6.35)	-0.06992 (-1.01)
1976	0.1771 (5.50)	-0.1354 (-1.52)	-0.6556 (-0.56)	0.8328 (0.26)
1978	0.2826 (9.43)	-0.03249 (-0.38)	0.6862 (0.63)	-0.5405 (-0.17)
North East	-0.07572 (-1.49)		-1.3962 (-0.75)	
North Central	-0.07688 (-1.99)		-1.8842 (-1.34)	
South	-0.1760 (-4.26)		-3.1926 (-2.12)	
Texas	0.003291 (0.06)		6.2815 (3.17)	
Florida	0.2851 (5.16)		-0.2515 (-0.12)	
Adjusted R <sup>2</sup>	22.49		29.65	
Variance of the Estimate	0.2236		297.05	
F-Statistic	16.325		23.258	
Number of Observations	1691		1691	

In order to calculate the union or demographic wage markups reported in the text, a technique designed to reduce the bias from just exponentiating the relevant coefficient and subtracting one was used. The markups were estimated by:

$$\exp(c - (1/2) \text{Var}(c)) - 1,$$

where  $c$  is the estimated coefficient and  $\text{Var}(c)$  is the estimated variance of that coefficient.<sup>27/</sup> When more than one dummy is involved (such as to calculate the wage markup of a Californian union member based on the U. S. regression), the generalization of this procedure involves covariance terms as well.

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<sup>27</sup>See Arthur S. Goldberger, "The interpretation and Estimation of Cobb-Douglas Functions," *Econometrica*, Vol. 35, No. 3-4, July-October, 1968 for a discussion of the biases involved and Peter E. Kennedy, "Estimation with Correctly Interpreted Dummy Variables in Semilogarithmic Equations," *American Economic Review*, September, 1981, p. 801 for a discussion of the calculation used here. Were the dummies to be treated as endogenous, a different markup would have to be calculated, as discussed in Jeffrey M. Perloff and Robin C. Sickles, "FIML Estimation of Union Wage, Hours, and Earnings Differentials in the Construction Industry: A Nonlinear Limited Dependent Variable Approach," Giannini Foundation Working Paper, December, 1982.

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