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THE AFTERMATH OF THE BRACERO: A STUDY OF THE ECONOMIC IMPACT ON THE AGRICULTURAL HIRED LABOR MARKET OF MICHIGAN FROM THE TERMINATION OF PUBLIC LAW 78

By

John Dancer Mason

A THESIS

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ABSTRACT

THE AFTERMATH OF THE BRACERO: A STUDY OF THE ECONOMIC IMPACT ON THE AGRICULTURAL HIRED LABOR MARKET OF MICHIGAN FROM THE TERMINATION OF PUBLIC LAW 78

By

John Dancer Mason

As a result of the termination of Public Law 78 in 1964, Michigan agriculture failed to receive Mexican national workers (braceros) in the following year: the first year since the early 1940's that braceros were not used in the state. In 1964, the foreign workers were used primarily in the pickle industry of Michigan, constituting roughly 80 per cent (12,800 workers) of the peak employment in pickles.

Before 1965, the pickle industry argued that termination of the bracero program would seriously affect the industry, because domestic migrants simply would not pick pickles ("stoop labor" work). Consequently, increased wage offers would not elicit a very large supply response from domestic migrants, and the end result would be acreage declines and other adverse adjustments. In addition, several previous studies of the seasonal labor market for agriculture, and

particularly the seasonal labor market for Michigan pickles,[1] tended to support the claims of the industry.

The thesis examines the "stoop labor" hypothesis that the supply response of domestic migrants to increased wages would be inelastic, by examining three questions: What was the wage adjustment for all seasonal workers in Michigan agriculture following 1964? What was the supply response of domestics to wage adjustments in the pickle industry? To what extent did acreage declines and capital substitution occur in the Michigan pickle industry as a result of the termination of the bracero program?

A detailed microeconomic study of the seasonal labor market for Michigan agriculture was conducted, involving: interviews with agriculture and labor officials, growers, and pickle industry personnel; a mailed questionnaire to pickle growers in Michigan; examination of data collected by other agencies. On the basis of the study the stoop labor hypothesis was not supported.

The major findings of the dissertation are:

(1) From 1964 to 1965, a statistically significant increase in the wages of all hired workers in Michigan

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[1]Lloyd Gallardo, "An Evaluation of U.S. Department of Labor Policy Regarding Wages Paid Mexican Nationals: Michigan Pickles, A Case Study" (unpublished Ph.D. dissertation, University of California, Berkeley, 1962), 76.

agriculture was found, and there were noticeable increases in non-wage provisions of employment.

(2) The supply response of domestic migrants to higher wage offers in the pickle industry was not clearly inelastic as the hypothesis suggested. An identification problem was encountered in measuring the appropriate supply curve of domestic agricultural labor, compounded by wage and employment data which measured the market "between" seasons, when the needed measurement was "within" an ongoing season. An attempt was made to resolve this problem, and the indications were that the supply curve may have been elastic. Both of the above findings suggest that the pickle labor market was not segmented from other agricultural labor markets in the state and that domestic migrants would do stoop labor work.

(3) Acreage declined slightly in 1965 and 1966, but in 1967 the harvested acreage for the state was clearly as high as for years prior to 1965. The increase in 1967 however, was probably due to the increased use of a mechanical pickle harvester. The industry doubled its use of the harvester each year between 1964 and 1967, as measured by acreage covered in the state.

The thesis examines in detail the agricultural labor market in Michigan, particularly with respect to the nature of wage changes and the effect of fixed wages.

In doing this a considerable amount of institutional information about this labor market is developed.

To Sharon and Matthew

(who were there at the end of a
long day in the library)

ACKNOWLEDGMENTS

A work like this obviously develops from the efforts of many people, though none but the author bear the responsibility for any misconceptions and errors. I would like to thank my thesis committee and particularly my chairman, Jack Stieber, for their patient willingness to read over several drafts and make detailed comments. In addition I greatly appreciate the cooperation received from the federal and Michigan labor departments in making information available to me and warmly chatting with me. I think particularly of William Haltigan and Stan Knebel in Washington, and the several Crop Area Supervisors in Michigan. Noel Stuckman of the Michigan Farm Bureau was instrumental in helping establish the methodology. Several Michigan employers of migrant labor were very kind in making time available to me, including my father, who not only provided me with a great deal of information over the years, but also taught me by example to love those who were less fortunate, as he did his many workers. Finally, I want to thank my wife, Sharon, both for her help in the research and preparation of the thesis, and for her willingness to support me emotionally throughout the many long hours involved.

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CHAPTER I

INTRODUCTION

The Problem

For most years since the outbreak of the Second World War, Michigan agriculture has had access to foreign workers. As Table 1 indicates, foreign workers were imported into the state in 1943 and continued to be imported through 1964. The number of foreigners dwindled in the late 1940's, since the regulations then allowing importation were extended war-time regulations and provided no sound basis for a peacetime program of supplemental labor. In 1951, the Congress enacted Public Law 78 (PL-78) which provided for the importation of foreign workers from Mexico (braceros), (1) whenever domestic agricultural workers could not be obtained, and (2) when the use of foreign workers would not "adversely affect" the wages and working conditions of domestic workers.[1]

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[1]Act of July 12, 1951, ch. 223, 65 Stat. 119, "Title V--Agricultural Workers," an amendment to the Agricultural Act of 1949. The seasonally hired labor force of agriculture is composed of local and migrant workers, whether intrastate, interstate, or foreign. Most seasonally hired workers in Michigan agriculture are migrants. Unless otherwise noted, the term migrants will mean all seasonally hired workers, and the labor market, however named, will be the seasonal labor market of agriculture.

TABLE 1.--Peak employment of foreign workers in U.S. and Michigan agriculture, 1942-67.

Year	U.S. Peak*	Mich. Peak**	Year	U.S. Peak	Mich. Peak
1942	4,200	--	1955	240,841	8,398
1943	36,289	3,838	1956	290,156	10,851
1944	66,572	8,549	1957	272,435	14,372
1945	94,210	10,031	1958	284,835	9,549
1946	45,354	4,359	1959	308,168	11,046
1947	96,840	1,970	1960	246,675	11,234
1948	40,000	1,247	1961	220,934	14,350
1949	85,600	224	1962	127,032	12,712
1950	89,100	200	1963	105,454	13,500
1951	130,104	2,494	1964	92,784	12,843
1952	139,437	4,587	1965	23,698	--
1953	171,128	8,880	1966	12,169	--
1954	202,626	6,300	1967	12,531	--

Source: *USDL, Bureau of Employment Security, Farm Labor Developments (February, 1968),14. **Michigan Farm Labor Service, Michigan Farm Labor Report: Post-Season, annual issues.

This law gave rise to consistently larger numbers of foreign workers in Michigan agriculture than was true before its enactment.

During these years two Michigan crops made the greatest use of braceros, sugar beets and pickles. In the early 1950's, sugar beet companies imported braceros in the late spring for weeding and thinning and used them again in the fall for harvesting. Between these two periods the pickle industry used them for weeding and harvesting. Selected other crops made use of the foreigners, but the number of workers involved was very small. Into the 1960's the sugar beet industry lessened its use of the braceros considerably. Mechanical harvesting operations had been implemented and much of the pre-harvest weeding and thinning was done either by domestic migrants or chemicals. Thus by 1964 most of the braceros were used in pickles. In 1964, approximately 80 per cent of the pickling cucumber harvest labor force were braceros, and this approximated 20 per cent of the August seasonal labor force for all crops in Michigan.[1]

In December of 1964, the Congress allowed PL-78 to expire, having extended it six times previously. Roughly at the same time the Congress amended Public Law 414

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[1]These percentages are derived from estimates of seasonal employment made by the Michigan Farm Labor Service, and reported in Michigan Farm Labor Report: Post Season, 1964 (Detroit, Michigan: 1965).

(PL-414) to allow for importation of foreign workers,[1] but admonished the Secretary of Labor to enforce the provisions of this law strictly.[2] Subsequent to 1964 Michigan employers failed to qualify for importation of foreign workers under PL-414, and the flow of braceros to Michigan ceased.

These events of the 1964-65 period provided the setting for an adjustment in the seasonal labor market of Michigan agriculture. As a result of the braceros' departure considerable pressure was applied on selected employers to obtain domestic replacements. This pressure was heaviest on the pickle industry but was felt by employers in other crops as well. The adjustment of this labor market allows the testing of a commonly held hypothesis concerning the supply of domestic workers to agriculture.

Hypothesis

Employers of seasonal, agricultural labor have held a conception of the supply curve of domestic labor which

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[1]The Immigration and Nationality Act of 1952, 8 U.S.C. sec. 214(c) (1952), as amended by Public Law 89-236 (1965). Throughout the life of PL-78 this law was used to allow importation of workers from Canada, the British West Indies, and selected other countries, but these numbers were dwarfed by the large number of nationals from Mexico entering under PL-78.

[2]See "Statement by Secretary of Labor W. Willard Wirtz on the Termination of Public Law 78," released as U.S. Department of Labor NEWS, USDL--6442, December 19, 1964.

can be described as the "stoop labor" hypothesis. This hypothesis states that certain agricultural tasks (stoop labor) are so undesireable that domestic migrants will not want to do them regardless of remuneration. Also, the labor force of domestic workers willing to do seasonal agricultural work is perceived as a clearly defined amount, set apart from other segments of the general labor force by sociological and cultural factors. Consequently, a wage increase in stoop labor tasks would not attract outside domestic workers. Theoretically, this hypothesis suggests that the supply response of domestic workers to a wage increase in these tasks would be inelastic--curve SS on Figure 1.

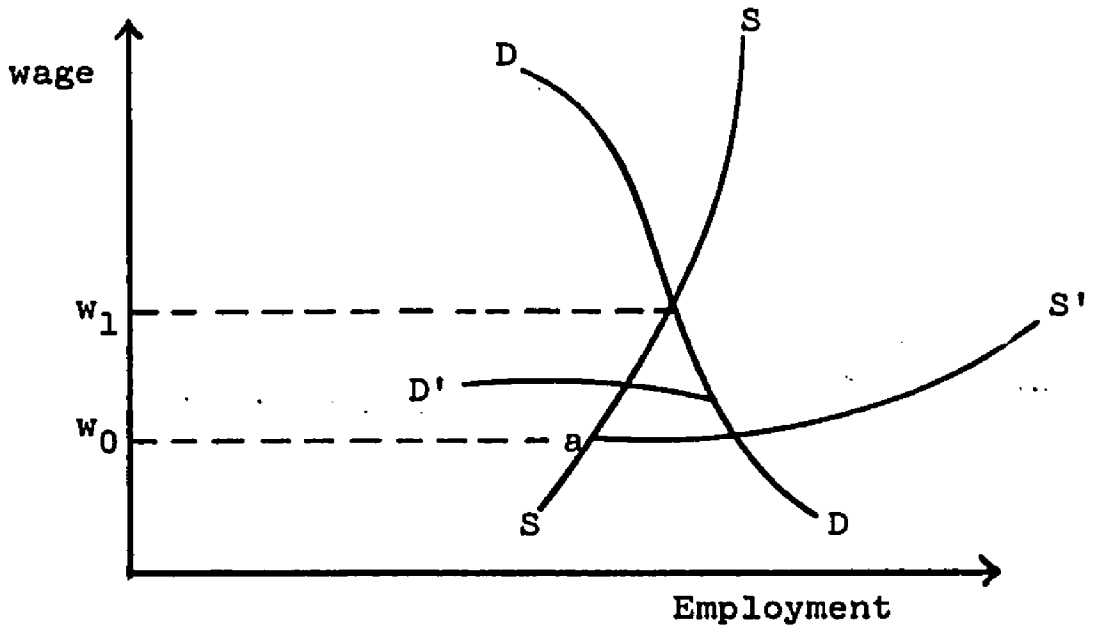

Fig. 1.--Demand for and supply of seasonal workers to stoop labor crops in Michigan.

Not only is this view of the supply curve held by employers, but it has been suggested by various studies of the harvest labor market, and particularly by studies of the harvest labor market for Michigan pickles.[1]

On Figure 1, DD is the demand curve of a representative employer (or area of the country) for stoop labor, and SS is the supply curve of domestic labor willing to work in the stoop labor task. The effect of the bracero program was to add a segment (aS') to the supply curve at the minimum contract price, w_0. With braceros available the ruling wage rate would be w_0. If braceros were denied the employer (or region), wages would rise to w_1 in order to attract domestic workers. This wage rate, w_1, would be sufficiently high to create considerable hardship on growers. Some employers would plow the field up rather than pay w_1. In this case their demand (D'D) would become highly elastic just above w_0. More likely, most growers would not plant the crop again in the following year, or mechanize, such that in the long run, DD would shift back much closer to the vertical axis. In the period following 1964 in Michigan, most of these conditions were expected by the pickle industry, and also by selected other stoop labor crops.

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[1]For an expression of the views of both employers and students of the market, as well as a more elaborate theoretical examination of the hypothesis, see Chapter III below, under "Supply Considerations."

If the stoop labor hypothesis were true, then in the years following 1964 in Michigan agriculture, the wages to domestic pickle workers would rise significantly (w_0 to w_1),[1] and the supply response of domestic workers to these higher wages would be limited (q_0 to q_1): surely less than an increase proportionate to the rise in wages. Since only very few domestic migrants would be attracted into the pickle fields, there should be little "spill-over" effect of the reduced pickle labor force on other crops, and thus wages in other crops would not be affected very much. As a result of the higher wages in pickles there probably would be a serious reduction in pickle acreage, or a rapid substitution of capital for labor.

If the stoop labor hypothesis failed to hold then the appropriate supply curve of domestic labor to pickles would be more elastic and the supply response to a wage increase would be much greater. Similarly, the effect of the bracero pull-out on other crops would be greater, since the pickle industry would be drawing workers from these crops and forcing wages in the competing crops upward. Finally, the acreage reduction and/or capital

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[1] If there were not a significant wage increase the conclusion would follow that the presence of braceros exercised only a de minimus effect upon total supply and the supply curve of domestic workers was far more elastic than SS suggests, approaching SS'.

substitution in pickles from the higher costs would be less if the hypothesis failed to hold.

Chapters IV and V below take up the analysis of the hypothesis directly. Chapter II lays an institutional background for Michigan agriculture and Chapter III discusses the seasonal labor market theoretically in the context of the literature. Appendix I provides an institutional view of the production function in agriculture, as it gives rise to the demand for seasonal labor, with special consideration paid to pickles.

Methodology[1]

To evaluate these questions a detailed micro-economic study was conducted. Four major sources of information were used: (1) interviews with individuals involved in the agricultural labor market of Michigan; (2) written reports on the nature of the labor market and the adjustment process; (3) quantitative data on wages, employment, non-wage provisions, and other pertinent variables collected by several agencies; and (4) data generated from a questionnaire used in the research.

The first two sources of information, interviews and written reports, contain bias regardless of the control techniques; the only recourse is to identify the

[1]Appendix II discusses data sources and includes a detailed account of the methods used, some idea as to the rationale for these methods, and possible problems with the data.

bias. Interviews were conducted in Michigan with employers of agricultural labor, employment service personnel, agricultural extension service personnel and selected pickle processing company personnel.

Data relevant to this labor market are collected by two governmental agencies: (1) the Farm Labor Service, a branch of the Bureau of Employment Security, U.S. Department of Labor, and (2) the Statistical Reporting Service of the U.S. Department of Agriculture. Appendix II contains a discussion of the procedures used in obtaining these data and some indication as to their reliability.

To provide information on the Michigan pickle industry for years since 1963, a questionnaire was designed and mailed to pickle growers throughout the state. As discussed in Appendix II, approximately twenty per cent of the state's pickle acreage in 1967 was represented in the responses to the questionnaire; and the responses seemed to be biased towards larger growers.

The Problem in Perspective

The examination of the adjustment of Michigan's agricultural labor market provides insight into two traditionally conflicting public policy issues: (1) how to supply sufficient labor to meet a highly

seasonal demand in America's agriculture and assure an adequate food supply, and (2) how to alleviate the poverty among large numbers of American migrants. These issues, both parts of an overall manpower policy, will be considered in turn.

Supply Problem

Many industries are affected by seasonality of labor demand and most have been able to control it. For agriculture, however, the combination of an acute seasonal labor need and a highly competitive industry structure seems to present a special problem. The peculiar biology of plants maturing and ripening as they do, and the continued reliance of the production process upon weather, combine to create short periods of time, usually at harvest, when large numbers of hand laborers are needed. The danger of perishability, either from spoilage of the crop in the field or loss of market value,[1] makes the seasonal requirements even more pressing.

Technological advances[2] affecting both the pre-harvest and harvest periods have lessened considerably

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[1]Reference is again made to Appendix I for a discussion of these terms and other institutional background.

[2]The forms of this technological change are diverse. Mechanically new techniques have been devised, and in conjunction with this new plants have been developed, new weed, disease, and insect sprays adapted, and new ecological methods used. The inter-working of all these forces can be seen vividly in the pickling cucumber industry (see Appendix I).

the large seasonal labor need of the past, and this force appears to be the sole salvation for the future. Crops grown to be processed, for example frozen strawberries, onions in Campbell's soup, or cherries in a can, thus far have been most amenable to mechanization. This is so because the quality (or outward appearance) of the fruit is not of crucial importance and mechanical harvesting often bruises the surface of the fruit. However, the harvesting of crops to be sold fresh, without any processing other than cleaning or packaging, has proven particularly difficult to mechanize. On the one hand the market is reluctant to accept damaged fruit; in addition, damaged fruit, unless quickly treated (processed), will spoil. Thus, the need persists for relatively large numbers of workers for short periods to harvest these crops.

The long run trend towards increasing farm size seems to affect seasonality in diverse ways. Larger farms, many specializing in one or a few crops, have intensified seasonal labor needs by greatly enlarging the acreage of labor-using crops in specific areas. At the same time these farms can afford economies of scale to make use of all available mechanical and technological techniques, thus reducing seasonal labor demand from what would exist if the same acreage were grown on a number of smaller farms.

An uneven rate of technological adaptation in different crops has created a heightened situation of structural imbalance in this labor market. At one time workers in Michigan could arrive in the spring and start work in strawberries, move into sugar beets and pickles, then to cherries, back to pickles, to tomatoes and potatoes, and finally to apples and then sugar beets again. Interspersed throughout these major crops were numerous other work opportunities: asparagus early, raspberries and blueberries through the heat of the summer, and onions and other small labor-using crops in the late summer and early fall. By 1968, early sugar beet work had dwindled considerably and late beet work was nonexistent. Blueberries and processed cherries were becoming increasingly mechanized. The processed tomato harvest promised to become mechanical by the 1970's, onions had been since about 1963, and almost all potatoes were dug mechanically. This presented a problem to workers, as will be explained below, but it also confronted the growers of certain crops with the problem of obtaining labor for only short periods, a costly proposition when workers had to be transported both to and from the farm and their place of residence, and provided housing while in Michigan.

Poverty Problem

The other side of the growers' labor supply problem is the workers' problem of finding sufficient work. In an appallingly real sense the majority of the workers are caught between two alternatives, neither of which lends much hope. As the labor market tightens and wages rise, growers can choose the alternative of substitution--substitution of non-labor inputs for labor inputs in the production of certain crops, and substitution of alternative uses of land for high labor-using crops. The empirical result of these retaliatory responses to wage increases has been reductions in demand roughly matching the reductions in labor supply.[1] The workers' alternatives are more bleak. On the one hand, at the low wage levels of the past, is an existence of partial employment and unemployment reinforcing itself in what has been called a "culture of poverty." On the other hand as wages increase, which brings relief to some employed workers, the reduction in the number of workers demanded pushes others into heightened unemployment, a situation merely extending the former alternative.

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[1]See: Edward G. Schuh, "The Long Run Equilibrium in the Hired Farm Labor Force: History and Implications," Journal of Farm Economics, 43 (December, 1961), 1338; Edward G. Schuh and Edward W. Tyrchniewicz, "Behavioral Equations and Equilibrium in the Agricultural Labor Market," Journal of Farm Economics, 48 (December, 1966), 1222.

The dangers for workers are not just low wages, but a far more complex set of employment practices, all working to reduce their annual income and heighten work insecurity. As the seasonality of demand shrinks in terms of duration of employment, though perhaps not in peak intensity, gaps in the work schedule develop which cut into a continuous work pattern and reduce annual earnings. Irregular hours of employment have always plagued this labor market. Growers often are caught in the vices of weather and an oligopsonistic buyer market, which creates and destroys the demand for harvested crops without warning. This feeds back to the workers in bits and pieces of work. Probably in no other sector of the general labor market is the security of continuous employment so lacking as in the agricultural labor market.

CHAPTER II

MICHIGAN AGRICULTURE: INSTITUTIONAL BACKGROUND

Characteristics of Michigan Agriculture[1]

Crops of the State

Michigan is one of those unique states known primarily for some feature other than agriculture but possessing a relatively large agricultural sector. For many years in the 1950's and 1960's, Michigan used more interstate migrants than all other states, though falling behind such states as California and Texas in total migrant employment. The location of the state, just east of Lake Michigan makes it climatically a favorable fruit-growing area. Several factors have contributed to make Michigan a large producer of other crops--proximity to

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[1]The following description of Michigan agriculture is not meant to be exhaustive. Other studies with greater depth are: Joachim G. Elterich, Glenn Johnson, and David Call, Perspective on Michigan's Farm Labor Problems, Agricultural Experiment Station, Michigan State University, 1963; Project '80: Rural Michigan Now and in 1980, Research Report, Agricultural Experiment Station, Michigan State University, 1966.

population centers, favorable land conditions, and historical development.[1]

Table 2 ranks selected fruit and vegetable crops among states on the basis of acreage and production in 1966. Characteristic of most of the crops on the table is their continued reliance upon seasonal labor for harvesting.

TABLE 2.--Michigan's rank among all states in acreage and production for selected fruit and vegetable crops, 1966.

Crop	Acreage Rank		Production Rank	
	All States	Seasonal Group	All States	Seasonal Group
Sugar Beets	5	-	7	-
Apples	-	-	3	-
Peaches	-	-	8	-
Grapes	-	-	4	-
Cherries, sweet	-	-	4	-
Cherries, tart	-	-	1	-
Asparagus			4	2
Cucumbers (pickles)	2	-	1	-
Onions	4	3	5	4
Strawberries	2	2	4	3
Tomatoes, proc.	12	-	10	3

Source: Michigan Dept. of Agriculture, Michigan Agricultural Statistics, 1967.

[1]An example apropos to this thesis is pickles. The industry developed in the state on a large scale in the early 1950's. The pickle can be grown on almost any high ground, but the climate of Michigan with cooler evenings turns out a firmer pickle that processes better. Also, Michigan State University was active in developing plant varieties which grow well in Michigan soil. The previous location of the sugar beet industry in Michigan provided a ready-made labor force. And earlier, with less efficient transportation systems, location near the market favored Michigan.

Growers who use seasonal labor are scattered throughout the bottom half of the lower peninsula of the state, and in selected areas above this line, notably along the western coast of the state up to the Grand Traverse Bay area and in the Alpena region on the upper eastern coast. In the lower portion they are concentrated along the western coast of the state with the densest concentration in the southwestern corner. The fruit farms are located mostly throughout this region. There are some strawberries grown in the Alpena and thumb areas, and apples are grown throughout the state. A band running across the middle of the lower peninsula contains numerous employers of seasonal labor, mostly pickle, potato, and sugar beet growers. Tomatoes are found along the southern edge of the state. Figure 2 shows the areas of migrant worker employment for 1960 and 1965, and a comparison of the two years gives some idea of the shift in areas of employment. As can be seen, a more concentrated pattern of employment seems to be emerging in 1965, converging along the western coast and in a band across the center of the state.

Seasonal Employment

Precise data on the total number of seasonal workers in Michigan agriculture are not available, but can be estimated from two sources. Table 3 presents employment figures as recorded by the Farm Labor Service

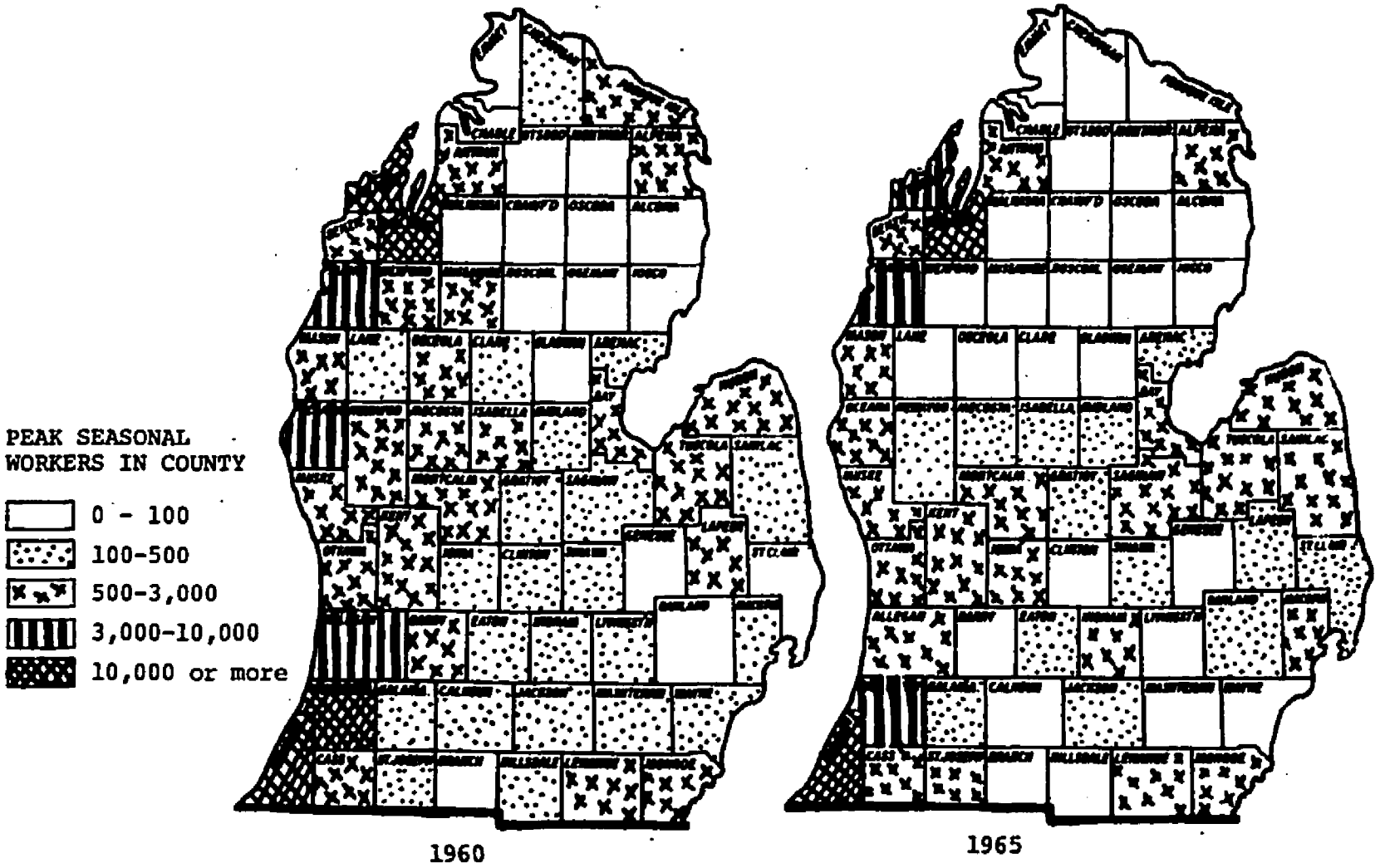

Fig. 2.--Concentration of migrant worker employment in Michigan by counties, 1960 and 1965.

Source: U. S. Department of Labor and U. S. Department of HEW, Domestic Agricultural Migrants in the U. S., Public Health Service Publication No. 540, revised 1960 and revised 1965.

TABLE 3.--Peak employment and average May-October employment as recorded by the U. S. Department of Agriculture and the Michigan Farm Labor Service, 1950-67.

	U.S. Dept. of Agriculture*		Mich. Farm Labor Service**	
Year	Peak Empl.	May-Oct. Empl.	Peak Empl.	May-Oct. Empl.
1950	94,000	67,300	56,900	32,056
1951	93,000	67,000	81,307	44,500
1952	96,000	68,000	95,798	54,105
1953	92,000	61,800	72,433	45,460
1954	81,000	62,000	66,580	42,918
1955	79,000	60,500	73,881	42,759
1956	78,000	56,500	74,001	46,723
1957	85,000	59,200	74,228	50,085
1958	81,000	60,300	82,479	48,700
1959	80,000	60,500	86,580	48,369
1960	75,000	57,500	83,989	48,500
1961	79,000	58,700	91,584	43,498
1962	71,000	55,200	97,665	45,357
1963	76,000	59,000	83,447	38,869
1964	80,000	53,000	93,384	42,985
1965	59,000	43,300	70,688	40,107
1966	54,000	38,700	67,635	33,811
1967	46,000	36,700	70,439	40,167

Source: *Data are collected for the last week of each month and recorded in Farm Labor, USDA, Statistical Reporting Service, selected issues. **Data are estimated on the 15th of each month, and recorded in Michigan Farm Labor Report, Post-Season, annual issues.

Note: As can be seen, for the 1950's the USDA estimates are larger than those of the FLS, while in the 1960's the reverse is true. Undoubtedly this is due to the population which the USDA estimates. This population includes all hired workers, not just seasonal workers. Thus, as the secular decrease in the number of farms took place over this seventeen year period, the number of non-seasonal workers declined, shrinking the estimate.

of Michigan, and the U.S. Department of Agriculture's Statistical Reporting Service. The Farm Labor Service (FLS) estimates are for seasonal employment only, while the Department of Agriculture (USDA) estimates are for all hired workers in Michigan agriculture. The FLS data probably overstate peak employment during the 1960's, but are considered reliable in terms of May-October average employment, the period of greatest migrant use. The USDA data probably understate peak employment but are considered more reliable than the other estimates in terms of trends, even though they include all hired workers and not just seasonally employed workers. See Appendix II for a discussion of the differences in the estimates.

As the table shows, there was a fairly steady annual decline from 1950 through 1956 in both peak employment and average May-October employment. From 1956 through 1964 there was a period of fluctuation with a mild downward tendency. Since 1964 employment has dropped off considerably.

These figures for Michigan can be compared with data on total U.S. agricultural employment--see Table 4. The percentage figures in this table provide some comparative perspective, however they must be viewed with caution since the factors which determine total U.S. employment can differ from those determining Michigan

employment. For example, bad weather one year in Michigan may not be matched by similar weather elsewhere, and this could result in a lower percentage figure. The general indication appears to be that Michigan employment, both its peak intensity and May-October average, is falling off slightly relative to total U.S. employment.

TABLE 4.--Total U.S. hired agricultural employment and percentage comparisons with Michigan hired agricultural employment, 1950-66.

Year	U.S. Employment (000)*	Michigan Employment as % of U.S.*,**	
		Mich. Peak	May-Oct. Av.
1950	4,342	2.16%	1.54%
1951	3,274	2.84	2.04
1952	2,980	3.22	2.28
1954	3,009	2.69	2.06
1956	3,575	2.18	1.58
1957	3,962	2.14	1.49
1958	4,212	1.92	1.43
1959	3,577	2.23	1.69
1960	3,693	2.03	1.55
1961	3,488	2.26	1.68
1962	3,622	1.96	1.52
1963	3,597	2.11	1.64
1964	3,370	2.37	1.57
1965	3,128	1.88	1.38
1966	2,763	1.95	1.40

Source: *U.S. Dept. of Agriculture, The Hired Farm Working Force. **U.S. Dept. of Agriculture, Farm Labor.

Peak employment data for the main seasonal labor-using crops in Michigan are presented in Table 5 for

recent years. The vertical order of the crops is roughly that of the progression of demand periods through the migrant season. Employment in onions dropped off so much by 1967 that the Farm Labor Service discontinued listing it separately. Cherry employment also was down in 1967, reflecting a poor yield and increased use of cherry shakers. The highest wage bill would be found in pickles due to the length of the harvest season and a large pre-harvest labor demand.

TABLE 5.--Peak employment in selected Michigan crops, 1959-67.

Crop	1967	1966	1965	1959
Asparagus	3,768	3,957	4,725	4,800
Strawberries	27,288	29,035	25,125	26,500
Sugar Beets	4,794	3,696	5,160	6,400
Cherries	26,325	31,630	37,325	33,000
Blueberries	12,622	11,275	10,975	7,500
Pickles	18,533	16,545	11,595	14,000
Raspberries	5,474	6,000	2,000	3,500
Tomatoes	5,430	5,455	5,350	5,500
Peaches	2,457	2,185	2,663	4,500
Onions		775	1,035	3,500
Grapes	2,500	2,675	3,050	3,500
Potatoes	2,565	2,362	3,070	5,000
Apples	11,224	11,295	12,300	

Source: Michigan Employment Security Commission, Farm Labor Service, Michigan Farm Labor Report: Post Season, annual issues.

Figure 3 graphs the May-October employment estimates of the Farm Labor Service for the 1967 migrant season for selected Michigan crops. The peak employment

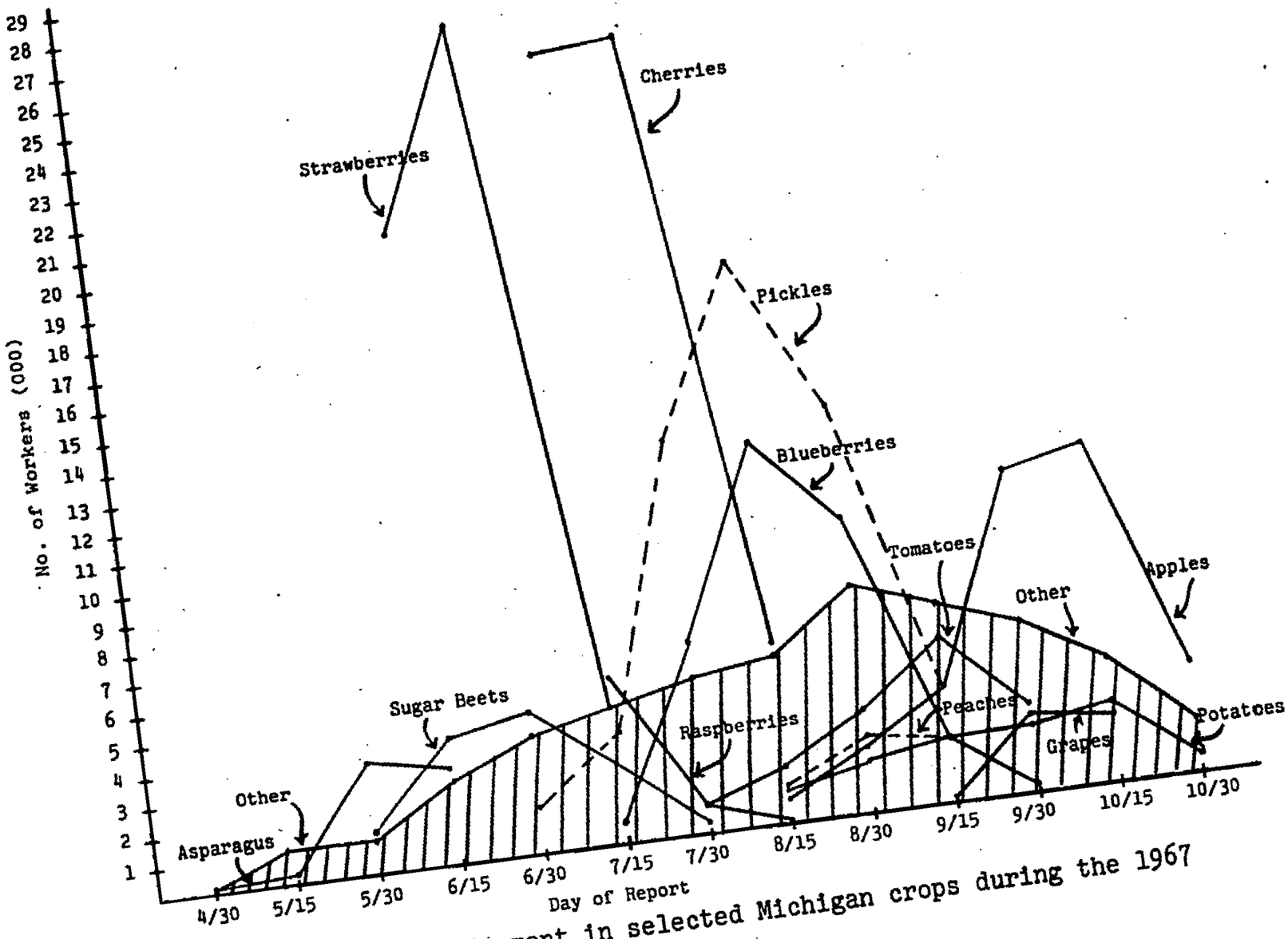

Fig. 3.--Bi-monthly employment in selected Michigan crops during the 1967 immigrant season.

for each crop is the same as that presented in Table 5. Using this figure, the period of high labor use for the different crops and the progression of the work pattern through the summer can be seen. The pattern was far more complete in earlier years, however continuous work can still be found from the middle of May through the end of October. The major gaps are in late June and early July, between strawberries and cherries, and in middle September between tomatoes and pickles, and apples.

The season's first migrants arrive in late April and early May for orchard-cleaning and strawberry preparation work. Large numbers appear in late May and early June for asparagus and strawberries, and they continue to come through the peak of the cherry season. Following this, a net outflow begins which steps up considerably in early September at the tail-end of the pickle crop, and by November few migrants can be found.

Prior to 1963, braceros arrived in late May and early June to work in sugar beets, then moved to pickles for pre-harvest work and harvest work, staying through the middle of September or later. In 1963 and 1964, they arrived around the middle of July to work the pickle fields and then remained about the same length of time as before. In all these years braceros worked in selected other crops, usually near the end of the pickle season.

Ethnically, the seasonal labor force of Michigan has more Mexican-American workers than other races, coming mainly from Texas--see Table 6. In addition to the Mexican-Americans are black and white workers from various southern states. A minority of the workers are whites from the Appalachia region, the stream of workers from that region having diminished considerably from earlier years.

TABLE 6.--Percentage of interstate workers in Michigan agriculture from selected states, 1961-67.

State	1961	1963	1964	1965	1966	1967
Texas	50.0%	68.0%	54.3%	52.5%	73.8%	61.7%
Florida	9.0	9.0	6.5	12.9	11.6	13.5
Louisiana	9.0	7.0	14.3	7.1	2.3	1.7
Missouri	17.0	8.0	7.6	5.2	2.7	1.9
Ohio	--	--	4.2	2.8	1.7	1.3

Source: Michigan Employment Security Service, Farm Labor Service, Post-Season Farm Labor Reports, consecutive issues.

Work Characteristics

The work requirements of the crops utilizing seasonal labor are sufficiently dissimilar that the labor market has become somewhat segmented, with certain types of workers tending to specialize in specific crops. Referring to those crops displayed in Figure 3 above, two general groupings can be made: (1) crops which do not require great physical stamina and exertion, and

(2) crops which require relatively more physical exertion. Of the first type, raspberries, blueberries, and grapes require less upward reaching or downward bending in the act of harvesting. Consequently, these crops have been more amenable to the work of women and children, especially from local sources.

The second group, and by far the major share of the work, requires more physical exertion. Of this group, some crops are of the "reaching-up" class and others of the "bending-down" class, almost conveniently splitting fruits and vegetables. Cherries and apples are the major examples of the first class. The work requires toting a ladder around a tree as well as from tree to tree and then climbing up and down and reaching out, often precariously, to gather fruit. The fruit is then placed in a bag hooked over the shoulder or around the waist. The work becomes less pleasant and more dangerous when done in poor weather, which easily can plague the late apple harvest, but may also affect cherry work.[1]

Bending down work, the second class, is commonly known as "stoop labor" and characterized as the least desirable of all types. Whether in the harvesting of asparagus, strawberries, pickles, or tomatoes the worker must bend over--or crawl--to pick the

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[1]See Myrtle Reul, Where Hannibal Led Us (New York: Vantage Press, 1967), Chapter 41.

fruit.[1] Unlike the reach-up type in which the continuity of the work is somewhat broken, stoop labor work is very monotonous, as laborers slowly move along long rows only to turn around at the end and start again.

The degree of undesirability connected with work in each crop would be difficult to establish. Economic theory would suggest, that other factors being equal among crops, wage rates would be an index of undesirability. But other factors have not been equal. Pickle and sugar beet growers had braceros available until 1964. In addition, pickle work provides more continuous employment than most other crops. Finally, pickle and beet workers are employed by large companies while workers in most other crops are employed by individual growers. As a result, wage rates do not act as an index of undesirability among crops. In general, however, workers do characterize stoop labor tasks as more undesirable.

Inter- and intra-state migrants have worked primarily in the second general grouping of crops. Hence the main migrant streams to and through the state start in strawberries, move north to cherries, and then south to pickles and tomatoes in Ohio, Indiana, and Michigan.

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[1]These crops remain the major employers of "stoop labor" in Michigan. Previously greater amounts of this work existed, e.g., topping onions, digging potatoes, pulling and topping sugar beets.

From pickles and tomatoes many workers return to their home base, especially those with children of school age. Others remain through the end of the apple harvest.

Since some of the major studies of this labor market have been drawn from California agriculture,[1] and the conceptualization of the workings of the market may be tempered by this, a brief discussion of the agricultural organization of Michigan and how it differs from other areas may be instructive. The "firm" of Michigan agriculture is more in the traditional mold of the family farm than that of the corporation farm of California. Though the employer side of the market is nowhere near a homogeneous one, many of the individual growers in Michigan contract their own labor and manage the workers on their own farms. More and more, however, the growers who do their own labor contracting are the larger ones, a few of whom have incorporated; however corporations in Michigan generally involve brothers, or a father and son, and are not of the size of some in other states.

Probably the closest approximation to the corporation farms would be the sugar beet and pickle

[1]See Lloyd H. Fisher, The Harvest Labor Market in California (Cambridge: Harvard University Press, 1953), and Varden Fuller, Labor Relations in Agriculture (Berkeley: Institute of Industrial Relations, University of California, 1955). The popular press also has used California as a backdrop, e.g., John Steinbeck's The Grapes of Wrath.

companies of Michigan, the primary employers[1] of foreign labor during the tenure of PL-78. These companies remain the largest employers of domestic migrants in the state. Workers are transported, housed, insured, and often supervised by the companies for the growers who contract with them (see Appendix I). Here the relationship between company employer and worker is far more impersonal than on farms where the owner is the primary employer. However, the analogy is not complete, since many workers hired by the company are housed and supervised on small farms, and hence traces of the traditional farm are not entirely dissolved.

Migrant Wage Package

Each labor market possesses its own unique allocators, generally the wage rate and specific prerequisites of employment. The agricultural labor market is somewhat different from many other markets due to its highly unstructured nature, as will be discussed in Chapter III. It is instructive, therefore, to view institutionally the allocation mechanism, termed the "wage

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[1]The meaning of "employer" may be questionable here since legally the nationals were employed by grower associations. For the most part, however, these associations were established and administered by the companies with which the growers of the association were contracted. See Lloyd Gallardo, "An Evaluation of U.S. Dept. of Labor Policy Regarding Wages Paid Mexican Nationals: Michigan Pickles, A Case Study" (unpublished Ph.D. dissertation, University of California, Berkeley, 1962), 96.

package." As here conceptualized the package consists of (1) the wage rate, and (2) non-wage provisions of employment. As the labor market adjusts to changing demand and supply forces, both components of the wage package act as allocators.

The wage rate denotes the rate directly connected with the work exerted, for example an hourly rate like $1.25 per hour or a piece rate like $.20 per bushel or $12.00 per acre. These are by far the most common methods of payment. A more unique method is one of the payment systems found in pickles where workers receive a percentage of the gross value of the crop (see Appendix I).

When payment systems other than hourly rates are used, a comparison of wages for different crops becomes difficult. On a piece rate basis an individual worker might be able to tell what his hourly equivalent would be: two and one-half bushels an hour at $.90 per bushel would give him $2.35 an hour, assuming the same picking conditions continued. However, to formulate an average hourly wage rate for all workers of a crop or for workers in different crops is more difficult.[1]

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[1]Fortunately the Rural Manpower Center at Michigan State University has conducted studies of productivity rates, both for different types of workers (good, poor) and different field conditions, and piece rate systems can be converted into hourly equivalents by using their results. The studies are available from the Rural Manpower Center of the Agricultural Economics Department, Michigan State University (East Lansing).

Obtaining an hourly equivalent from a system based on the percentage of crop value (e.g., 50%) is particularly difficult because of the number of varying factors which affect the hourly rate: the prices set out in the contract to the grower for the different grades of pickles; the condition of the field; the gross yield as well as size distribution of the yield; the weather; the conditions of the pickle market determining whether processors accept or reject larger grades or are touchy about the quality of regular grades. The U.S. Department of Labor fought this battle yearly with the pickle industry in trying to police a minimum contracted wage for Mexican nationals under PL-78. The only way to obtain a suitable figure was to match post-season earnings with total hours worked for each worker, a lengthy and sometimes impossible task.

The second component of the wage package, non-wage provisions of employment, is comprised of a relatively well defined core of employment conditions with a large marginal set of employment conditions which apply or do not apply depending upon how scarce the supply of labor becomes. Formal contracts of employment are infrequently used in the migrant labor market, the substitute usually being loose verbal agreements.[1] Hence very few

[1]The contract used for employment of braceros was written, however, and contained numerous specific conditions governing their employment, including a minimum wage and work guarantee.

non-wage forms of remuneration have become standard conditions of employment.

The fairly standard core of the non-wage provisions is made up of social security, housing, and transportation and loan money. By law employers must provide social security.[1] Housing is probably the most expensive of the core provisions, but the type of housing varies greatly by farm. The specific facility could be a comfortable lodging with indoor toilet facilities and electric stove and refrigerator, or a poorly insulated shack with a wood stove and bare springs. For the workers, housing is a necessity and becomes an enjoyable extra when pleasant, but since their purpose in the state is to make money, poor housing can be endured. In 1965, the Michigan legislature passed a law to establish minimum requirements for migrant housing, and this law has improved the standard of housing somewhat.[2]

To finance the trip from the place of dwelling to the location of work, contracted migrants are usually

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[1]Migratory workers have had social security coverage since 1956.

[2]This law, Public Act 289, requires inspection and licensing of all housing in which migratory workers dwell. Like so many laws of this type complete enforcement has been limited due to inadequate staffing and funds, but considerable progress has been made. For a report on employer compliance see the Annual Progress Report for the Agricultural Labor Camp Licensing Program, available from the Michigan Department of Public Health, Lansing, Michigan.

advanced transportation money--generally $.01 per mile per worker. In the middle 1960's the supply of workers became relatively scarce. Under these conditions growers were providing return transportation money to insure that workers would be available for the following season.[1] In addition workers often request funds to pay off debts incurred during the winter months, the amounts to be deducted from wages they will earn in Michigan.[2]

The value of these non-wage provisions on an hourly basis as a supplement to the wage rate is not easily obtained. Social Security is reported on an hourly basis, but the other two provisions are not except in very infrequent cases. The state of Michigan placed a maximum of $.08 per hour as the amount that could be deducted for housing under minimum wage provisions passed in 1964.[3] Studies which have estimated the gross amount of non-wage provisions received by

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[1]Pickle companies operating in the Saginaw area and contracting workers in sourthern Texas reported transportation costs at $35 per worker.

[2]One company field man planned on loans of $2,000 to $4,000 per family over the winter. Almost unanimously, employers testified to the reliability of Mexican-American workers in repaying these informal loans. Even if the workers failed to report they often would send the money from other parts of the country.

[3]The maximum housing deduction is $.08 per hour for a single worker occupancy and $.04 per hour for multiple worker occupancy of the same room. Other deductions are possible for such items as meals, heat, toilet, etc. For a current listing of the allowable deductions contact the Wage Deviation Board of the Michigan Dept. of Labor.

farm workers have found the value of the provisions to be less than that commonly received in non-farm employments.

> In addition to receiving lower wages, hired farm-workers generally receive fewer fringe benefits than do nonagricultural workers. A substantial proportion of farm wageworkers do receive some perquisites, such as room and board, housing, meals, transportation, and use of garden space. But, in general, the value of these items does not equal that of health and medical insurance, paid vacations, and other fringe benefits received by industrial workers. The quality of housing, sanitary facilities, and other housing equipment provided for farm wage workers is very often substandard.[1]

Though these three non-wage provisions generally are standard, an abundant supply of workers will weaken the willingness of growers to provide all of them. If an abundance of workers develops, transportation money and loans become harder to obtain, and housing is repaired less frequently.

Non-wage provisions beyond the standard core are included within the wage package only as the supply of labor becomes scarce. For example, during the 1966 and 1967 seasons, the pickle companies assured workers of a complete seasonal work pattern from late May through the end of pickle work in September if they would contract

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[1]Economic Development Division, U.S. Dept. of Agriculture, Rural People in the American Economy, Agricultural Economics Report No. 101, USDA, Economic Research Service (Washington, D.C.: Government Printing Office, 1966), 48. See also Elterich, Johnson, Call, Perspective on Michigan's Farm Labor Problems, 30-39.

to pick pickles. To carry through, the companies arranged employment in asparagus and strawberries prior to the pickle harvest. In 1967, however, when the labor supply was not quite as scarce as in the previous year, companies were not as hard-pressed to find employment for workers since there were numerous "free-wheelers" willing to replace contracted workers who left.

In addition to the continuity of work pattern the major other non-wage provisions are: number of family members employed and wages received; field conditions; and extra services performed. Supplementing these economic conditions would be the personal relationship between the employer and the workers.

In contrast to many stag crews of southern white and black workers, most Mexican-American laborers travel as families, and members of the families often work with the parents in the field. In markets of scarce supply an additional inducement to a family is that the children can all work and earn regular wages. In addition, employers often take pains to provide extra services like free gas for a weekend trip, quick repair of a broken refrigerator, free food, and numerous other amenities of this type. Weeds can slow workers and make work less desirable, and non-availability of field containers does the same; both field conditions can be remedied when the supply of workers is scarce, thus

enhancing worker productivity and earnings. The many forms these non-wage provisions can take are numerous. The point is that in this unstructured market there exists room for considerable non-wage variability in the provisions of employment.

If one expands the coverage of these provisions to include societal services like health care then agricultural workers fall further behind their urban counterparts. The President's Commission on Rural Poverty concluded, in part, that the availability of such services to rural individuals fell far below that for urban dwellers.[1] Mention should be made also of some of the amenities of rural living, for example the absence of congestion and smog and other sociological conditions of urban areas.

Worker Costs: Bracero vs. Domestic

To provide some additional background information for an understanding of this labor market, as well as speak to a question raised in the research, the following discussion of the labor cost per worker of braceros versus domestics is undertaken. A glance at Figure 4 will indicate that wage rates for hired agricultural workers increased significantly following 1964. However,

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[1]President's National Advisory Commission on Rural Poverty, The People Left Behind (Washington, D.C.: Government Printing Office, 1967), Chapters 5 and 6.

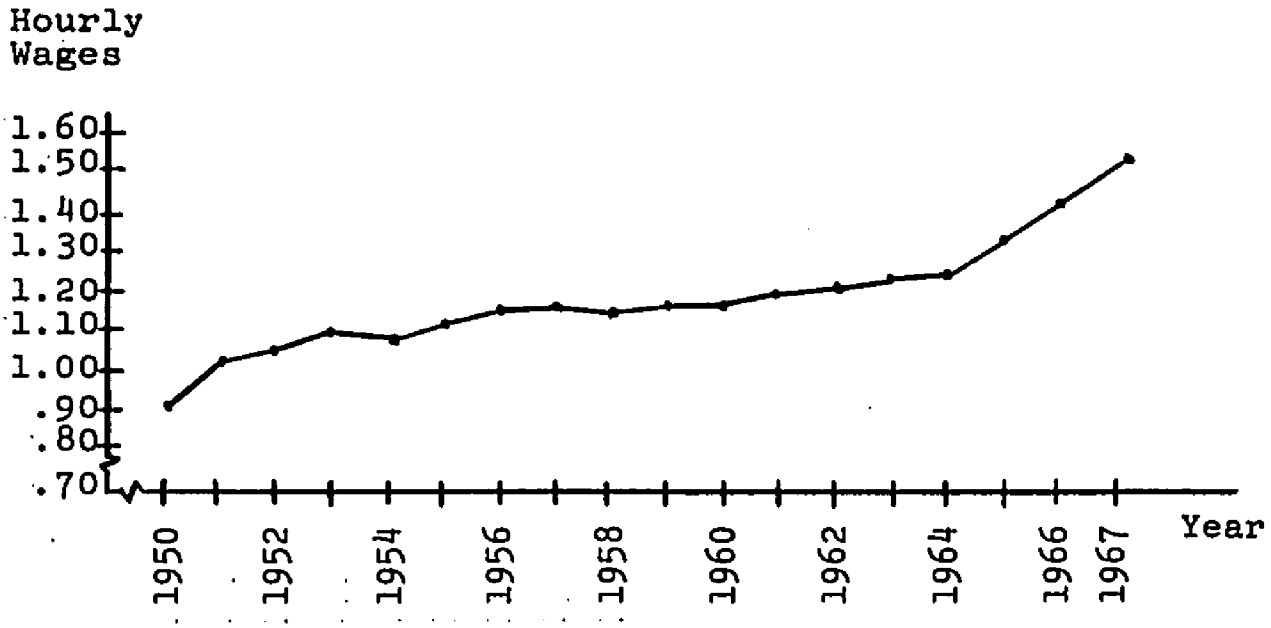

Fig. 4.--The July-October average wage rates for hired agricultural workers in Michigan, 1950-1967. (Source: U.S. Department of Agriculture, Statistical Reporting Service, Farm Labor.)

bracero workers had numerous contracted protections which affected non-wage employment conditions, for example minimum housing standards and a work guarantee. Thus there is some debate among employers as to which type of worker cost more. A common conclusion is that Mexican nationals cost more per worker and, therefore, how could their employment possibly harm domestic workers. This question will be attacked by examining four points of comparison: contracting expense, housing expense, employment expense, and productivity.

Contracting Expense

In order for growers to obtain braceros they first had to exhaust the possibilities of domestic workers; there had to be a shortage.[1] Since the law was administered by the Farm Labor Service, growers would place an order for a given number of domestic workers with them. The FLS would then check its files locally, intrastate, and interstate searching for domestic workers without commitments. The final step in seeking domestic workers involved the employer or his representative, accompanied by an FLS official, going to a supply state, generally Texas, and working out of the local FLS office there. If no domestic laborers were willing to work for the wage package offered, which by law meant either the wage package prevailing in the area of employment or the adverse effect package,[2] then this employer was certified

[1]Section 503 (1) of PL-78 stated: "No workers recruited under this title shall be available for employment in any area unless the Secretary of Labor has determined and certified that (1) sufficient domestic workers who are able, willing, and qualified are not available at the time and place needed to perform the work for which such workers are to be employed."

[2]The administration of the law changed around 1960 from a "prevailing wage rate" standard to an "adverse effect" standard. An adverse effect standard involved the establishment of a wage rate above prevailing wages which would not adversely affect the wages of domestic workers; braceros could not be imported and employed for less than this wage.

as eligible to receive braceros.[1] Upon certification, the employer paid the government a set contracting fee to cover costs incurred in administering the law and recruiting workers in Mexico.[2] Later in the year and just before the work began, the employer would go to a reception center and pick out the workers. The employer then had to provide transportation to Michigan, plus meals at $.50 each, and one night's lodging. Employers in Michigan figured the total cost of recruiting at about $80 per worker.

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[1]When an employer sought braceros, officials were required to go along to insure that the employer carried out "positive recruitment"; i.e., that he really did try to hire domestic workers and did not merely go through the motions. Even with this legitimatizing safeguard, candid comments from FLS officials who accompanied recruiters reveal that little positive recruitment was undertaken. As one official phrased it, the employer might say to prospective workers: "We are looking for pickle workers. We pay the same as others, but it is back-breaking work. Our housing is barracks-style, not really fit for families. We can't promise transportation. We want you to come, but we warn you it is hard work."

[2]The fee changed during the administration of the law. The original amendment allowed a maximum fee of $15 per worker. During the last few years of bracero use in Michigan, the fee was $12 per worker for workers obtained fresh from Mexico and $6 per worker for workers recontracted from other areas in the U.S.; a common practice was for Michigan pickle and beet companies to obtain braceros from the cotton fields of Arkansas.

The Mexican government did not want American employers recruiting in Mexico, and hence the law required the U.S. government to transport nationals from areas within Mexico to three reception centers along the border, but in the U.S. The fee was designed largely to cover the expense of recruiting in Mexico and maintenance of the reception centers.

The recruitment of domestic workers involves the same initial steps, the placement of a request with the FLS, which then exhausts its channels for non-committed workers. If no workers are obtained in this manner, the employer often travels to a supply state, under FLS auspices, to bargain for workers there. Those employers or employer representatives traveling to supply states may spend as much time there as when braceros were available, but this time they return with workers. Though no "contracting fee" is required, the employer usually advances transportation money and often loans in excess of this. When the expected labor supply is scarce, employers may make a second trip later in the spring to "firm up" previous commitments and offer any additional financial help to make sure workers arrive when planned. This may be followed also by a trip to the crop worked just prior to coming to Michigan. Each of these additional steps involve costs. When asked, employers usually cite the $35 transportation fee as the recruiting cost per worker, but it is obvious that real costs are much higher, perhaps approaching the $80 figure for nationals.

Housing Expense

The question of housing expense is a debatable one also. There is little doubt that housing cost per worker increased following 1964; but this increase can be

attributed to both the Michigan law passed in 1965 and the scarce labor supply, and is not necessarily a function of domestics versus nationals. Nationals came as stag groups and were generally housed in barracks-style accommodations. Since a national would be sent back or at least transferred around (which meant lost work-time) if he did not please the employer, few housing complaints would be expected. Surely the laborers would have accepted even minimal housing; but the formal contract called for certain basic requirements, and these were enforced by the FLS.

Domestic workers who replaced braceros were generally Mexican-American families. These workers desired separated living accommodations to achieve family privacy. The combination of the scarce supply and the 1965 housing law worked to provide more such accommodations for the workers than existed prior to 1965. There is good historical evidence to suggest, however, that had neither of these factors been at work, the guaranteed minimum standards written into PL-78 may have made bracero housing more expensive.

Employment Expense

By employment expense is meant the cost of the workers once they have arrived and are housed. The relative employment expense of nationals over domestics again would seem to turn on the scarceness of labor

supply--the more scarce it becomes, the more costly are domestic workers. Nationals were for all purposes a captive labor force. They were assigned to only one employer and could perform certain limited tasks. Because of the danger of being returned they doubtless caused little trouble that would require employer energy or cost, and most important they could not leave suddenly for a better situation elsewhere. This fact would serve to reduce expenses involved in satisfying workers, which often arise when labor supply is scarce and employers are fearful of losing their domestic labor.

On the other hand employing nationals created some unique expenses. By the contract they had to be assured work during 75 per cent of the contracted period. This, combined with the fact that the workers could do only selected tasks, put an additional burden upon employers to "make work" in the given tasks.[1] For domestics,

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[1]Prior to legislated changes in the law in 1961, nationals were more flexible in their work assignments and could be transferred among a number of tasks; at times they were found in the processing plants. Congress severely limited such practices by stipulating: "No workers recruited under this title shall be made available to any employer or permitted to remain in the employ of any employer--(1) for employment in other than temporary or seasonal occupations, (2) for employment to operate or maintain power-driven self-propelled harvesting, planting, or cultivating machinery . . . ." This was an amendment to Sec. 504 of PL-78, enacted as Public Law 87-345 on October 3, 1961 (75 Stat. 761).

however, male workers can be employed at all tasks, and these workers carry no legal minimum work time guarantees. Nationals had to be transported while in Michigan, whether from field to home or vice versa, or from lodging to local stores and to the post office. Domestics generally supply their own transportation, either coming in cars or the bus of a crew leader. When nationals were employed, strict records had to be kept which, at the time, was not the case for domestic workers.

Productivity

The last point of comparison is productivity. National workers were selected from numbers of their countrymen on the basis of physical appearance, and hence strong-looking male workers were brought to Michigan fields.[1] Due to their captive nature they could be relied upon to work diligently. As a result their productivity was quite good and Michigan growers still talk about the hard-working Mexicans. These factors working to increase productivity must be offset

[1]Due to minimum wage provisions set out in PL-78 and the common contract drawn up by the two governments, effective economic discrimination was blocked, and the allocation process turned on such factors as physical appearance. Thus, a husband and father of many children who earnestly needed American employment and would work quite hard, but was somewhat thinned and older in appearance, could be rejected for the healthy young buck with far fewer domestic responsibilities.

by any make-work or underemployment created by the work guarantees.

Domestic workers are far less homogeneous, made up of strong healthy males and females, frail women and children, and spirit-broken or rebellious workers of all ages, especially among southern blacks and whites. Growers contend that male Mexican-American workers are as good as braceros--many probably were braceros before slipping into the United States. However when families travel, women and children also seek employment, and when the supply is scarce these workers must be employed to retain the males. Hence, average productivity in what was previously bracero work is probably somewhat lower. However, this loss in productivity must be offset by a greater flexibility of domestics among different tasks.

To conclude that one group of workers was more or less expensive is virtually impossible. When the supply of labor was relatively abundant, braceros probably were more expensive. A 1954 study in California so concluded but suggested that the higher cost was in payment for greater work force security; employers knew a stated number of workers would arrive on a given date and remain until the work was completed, and the production process was scheduled on the basis of this

knowledge.[1] That braceros provided the security of worker availability clearly is true. However, that they were more expensive than domestics during the 1960's in Michigan is not so clear. The relevant alternative for the grower who did not employ braceros was to expend money "making sure" domestic workers would be available.

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[1]See Varden Fuller, John W. Mamer, and George L. Viles, "Domestic and Imported Workers in the Harvest Labor Market: Santa Clara County, California, 1954," California Agricultural Experiment Station, Giannini Foundation of Agricultural Economics, Report No. 184, January, 1956 (mimeographed).

CHAPTER III

LITERATURE DISCUSSION AND THEORETICAL COMMENTS

General Nature of the Market

As the descriptive material presented in the preceeding chapter suggests, the seasonal labor market of agriculture does not contain the finely-structured practices which are found in other labor markets, where unionization and formal labor-management contracts exist. During one season verbal promises made to workers by recruiters in March may be upheld strictly and even padded, while in the following season or even at different points in a given season, these same promises may hold little meaning.

Most students of this labor market have pointed to its unstructured nature, and such words as casual, irrational, and unorganized have been used to describe it. In 1945 Schwartz wrote of the casual nature of the agricultural labor market, made up of workers from various ethnic groups often competing with one another.[1] To him, an organized farm labor market would contain a central

[1]Harry Schwartz, Seasonal Farm Labor in the United States (New York: Columbia University Press, 1945), Chapter 1.

mechanism for bringing workers and employers together at the proper time in orderly fashion, and have facilities for giving workers information on job and living conditions and income possibilities, as well as giving growers information on the availability of supplies. "Properly operated, such a mechanism tends to equate supply with demand, at a wage acceptable to both employers and workers."[1] Contrary to this model were his conclusions about the seasonal farm labor market. The work required so little skill that all participants could be played against one another. Laborers had little if any job tenure, the work at one farm lasting maybe one or two hours or at most three or four weeks. "The casual nature of farm labor and its lack of an organized market are closely linked."[2]

The seeming intransigence of the casual nature of this labor market is seen in a progression of studies up to the present day. As recently as the fall of 1967, the President's Commission on Rural Poverty stated somewhat strongly:

> It [the farm employment economy] is a scene of chaotic and uncertain employment relations; it lacks the regimen and discipline of a competitive market; it lacks the structure of a labor market, partly because farm workers are excluded from virtually all labor legislation. Competition has traditionally been among workers, not among

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[1] Ibid., 22. One wonders where such a labor market exists.

[2] Ibid., 148.

> employers. With unrestricted entry and work that is divisible, 200 persons may be taken on to share a harvest that could be handled by 50.[1]

Fisher offered a set of five conditions which delineated an unstructured market:

> (1) there must be no unions with their usual accompaniment of seniority, preference of employment, and other limitations upon access to the labor market; (2) there must be an impersonal relationship between employer and employee, lest informal obligations and various types of moral tenure develop; (3) the productive employment must be largely unskilled so that it becomes accessible to a large and unspecialized labor force . . . ; (4) the method of compensation must be by unit of product rather than by unit of time; (5) the operation must employ little or no capital or machinery.[2]

In 1953, Fisher concluded the seasonal labor market of California fit these conditions fairly well--however, mechanization was increasing. Since that time one could say the same thing at the close of each season, except that the number of employees involved and the crops included would dwindle with each year.

It must be noted about these characterizations, however, that the lack of organization is directed towards the supply side of the market. For amidst all

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[1]President's National Advisory Commission on Rural Poverty, The People Left Behind, 38.

[2]Fisher, The Harvest Labor Market in California, 9. The suggestion of these conditions is that no pegs can be found on which to hang job rights. Number 4 may need some explanation. When paid by the piece, workers of all degrees of efficiency can compete. When paid by the hour, then workers of lower efficiency would be eliminated.

the apparent lack of organization, growers generally get their fields harvested. Fisher alludes to this when he says: "Paradoxically, the market for harvest labor is organized to maintain the advantages of disorganization."[1] In fact, there has been far more organization than the lack of structure in terms of wages and working conditions would suggest, especially among growers but also with workers.

Because workers traditionally have suffered from job insecurity and lack of assurance that wages and working conditions would remain the same day after day, the market has been deemed "unorganized." Lack of organization can easily convey the impression of workers and growers alike haphazardly groping with little thought or foreplanning in their actions. This has not been the case, and a better word (than unorganized) would be Fisher's word "unstructured."

Whenever a grower plants and nourishes a crop he anticipates the harvest. If the harvest requires seasonal hand labor, then he plans for the availability of that labor. Historically, large numbers of workers have been available at harvest time. If a grower anticipates numerous workers appearing then little "planned security" is necessary. And, if the abundant supply conditions persist through the harvest period, the additional

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[1] Ibid., 8.

workers will be placed in competition for the available work, thus cutting the earning potential of workers already employed. Under such conditions growers will be relatively indifferent about keeping workers contented and a high turnover may result. If, on the other hand, the grower cannot anticipate sufficient numbers of "free wheelers" at harvest time then he recruits workers, as has been sketched above for the situation among Michigan growers in 1966 and 1967. In the former case, growers may not have organized facilities for giving workers information about the job, as Schwartz suggests characterizes an organized market, but this does not mean they lack an organized approach to the job market; such facilities are not needed when numerous workers appear annually.

Among workers the poor income situation should not be interpreted to infer a lack of organization in their participation in the labor market. With each new season, many individual workers seek to prepare a complete work pattern. When possible they contract early with particular growers, but even without prior commitments they plan travel routes to areas where work is expected. They may plan poorly or be misled by false information, whether from growers or the Farm Labor Service,[1] but they

[1]During the season an official of the FLS has more frequent exposure with growers of his region than with one set of workers. To maximize the comfort (minimize complaints) and security in his job he has an incentive to "over-hire," or "over-recruit."

generally are not haphazardly groping. If more workers are planning in this manner than there are jobs returning sufficient earnings, then these plans may be thwarted, but this indicates no less organization on their part.

The market then has been an unstructured one rather than unorganized. Various reasons for the lack of structure could be offered, but the main one has been an historically abundant labor supply.[1] Following 1964 in the Michigan agricultural labor market far more structure was evident, as growers arranged completed work patterns for workers. One might expect formal job contracts with specific inclusions if scarce labor supply conditions were to continue. Thus a scarce supply over time may well yield a more structured market.

Demand Considerations

The demand by the individual grower for seasonal labor has been analyzed in relative depth by both Fisher and Gallardo, and the discussion here largely will review their contributions and make selected comments. Appendix I gives an institutional background for understanding

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[1]Others have dealt with this question in more depth, e.g.: Fuller, Labor Relations in Agriculture, and Alexander Morin, The Organizability of Farm Labor in the United States, Harvard studies in Labor in Agriculture No. 2-HL (Cambridge: Harvard University Press, 1952). The factor other than supply most often cited is the lack of legal protection under the National Labor Relations Act. It can be doubted, however, whether legal protection would guarantee a more structured market if abundant supply conditions persisted.

the demand for the agricultural firm. Throughout it is assumed growers rationally seek to gain optimal profits given constraints on their knowledge.

First, the firm's labor demand is a derived demand, stemming from the expectation of selling the product grown. As such the general constraints are the expected price of the product (crop) and the costs of alternative methods of production, namely the costs of mechanical substitution for hand labor. If the expected returns cover the growing costs and the hand labor cost is less expensive than alternative means, then the demand for hand labor arises.

In the case of pre-harvest labor demand growers have only a rough notion of expected returns for a given crop. A number of factors can affect the yield before the crop ever reaches the market and once there, the state of the market can fluctuate. Thus, the decision to hire pre-harvest labor faces few precise marginal constraints; the weeds must be removed for an adequate yield to result. This is not saying, however, that the relationship between expected returns and labor costs is non-existent. From the experience of previous seasons growers generally know what their costs should be, and labor costs considerably above the expected amount can limit labor demand. For example, if a grower is pessimistic about expected returns (say other growers have

large acreages and good crop stands) then he may have workers take out only the large weeds to limit the per acre labor cost.

The pre-harvest demand for labor then depends far more on the costs of alternative means of production than it does on expected returns. Hence, as technological advances yield new-weed killing chemicals and new weed-resistant plant varieties then per acre costs of the newer methods are compared with the labor costs per acre and a substitution point is derived. Most Michigan crops have pushed beyond this point and the pre-season labor demand has diminished considerably.

The harvest labor demand has received far more attention in the literature than the pre-harvest demand. It will be useful to separate the discussion into the short run and long run components of demand, the short run here referring to the decision to demand labor within an ongoing season, and the long run referring to the decision concerning labor demand between seasons.[1]

When facing a new growing season the grower must determine the crops to be grown. At this point, the expected labor costs help determine whether high or

[1]For most crops in Michigan the end of the growing year marks the end of the production period, and decisions for the following year turn on fresh information about relative costs and profit opportunities, given fixed factors as land and special equipment. For growers of perennial crops, e.g. tree and bush fruits, the relevant long run period may not be between the seasons but a longer period.

low labor-using crops will be grown. If there has been a recent experience of low or negative returns in a crop, or if increased labor costs are anticipated, then careful consideration will mark this decision. Two examples are pickles and sod. In 1965, longtime Michigan pickle growers had reason to anticipate labor problems, as there was considerable doubt whether braceros would be allowed to enter. On the basis of this, some growers substituted other crops for pickles, and planted acreage for the state decreased. In following years, when it was shown that domestic workers would harvest pickles, many of these same growers replanted pickles.

In various areas around the state sod has become a popular crop. This crop has a high income elasticity and thus has benefitted from the prosperity of the 1960's. But sod also requires far less labor per acre in comparison with alternative crops and becomes a good substitute for labor-intensive crops in times of rising labor costs. As seen in these cases, the elasticity of long run labor demand (between growing seasons) can be quite large, depending upon the ease of capital substitution and the profitability of alternative land uses.[1]

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[1]The long run labor demand would be the composite of a number of short run (within season) labor demand curves. A depiction of this can be seen on Figure 8, page 75 below.

The demand for harvest labor within an ongoing season is generally more inelastic. The crop becomes ready for harvest and the pay-off is close at hand; it must be harvested. Fisher characterizes the labor demand at harvest time as an "all or none" decision. The output is established and this determines the man-hours of employment necessary. On the basis of the ruling labor cost, either all of the crop is harvested or none, depending on whether the expected returns will at least cover all of the harvest costs and cut into if not cover the non-harvest costs.[1] The curve depicting the quantity of labor demanded within an ongoing season might resemble that of Figure 5, quite inelastic up to wage rate w_o, at which point the quantity demanded would fall off to zero.

Fisher also observed that growers have a tendency to "over-hire," to employ more workers than many observers might think necessary to harvest a given field. To the grower, however, there are numerous incentives encouraging the placement of many workers in the field. Gallardo summarizes Fisher's point well:

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[1]Presumably, if expected returns would not cover total harvesting costs then the crop should be plowed under. Frequently however, when crops can be stored, the expected value of the crop at harvest is highly uncertain. Therefore the harvest is gathered even if costs at that time may not be covered by the existing prices.

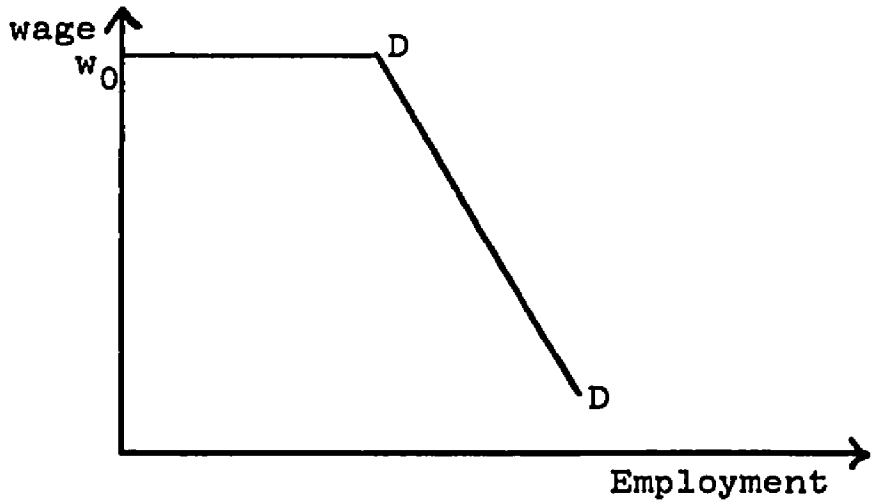

Fig. 5.--Hypothetical labor demand curve for harvest labor.

> The farmer always had an incentive to hire the largest number of workers commensurate with the rate at which the crop ripened, but short of that number that would cause "excessive" damage because of congestion in the field. By shortening the harvest period, the farmer minimized the risk of loss of crop from inclement weather and, if he shipped directly to market, got his crop there early enough to sell at premium prices; or, if he stored his crop for release later at a more opportune time, increased his "time span of control over his crop." Moreover, by hiring a larger crew, the farmer reduced the workers' tendency to harvest only that portion of the crop affording highest earning opportunities. By choosing a larger rather than smaller crew, however, he caused a fixed wage bill to be divided among more workers thereby reducing their average earnings.[1]

The practice of hiring numerous workers then reduces the uncertainty to the grower of getting a good return

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[1]Lloyd Gallardo, "Economics of the Demand for Harvest Labor by the Individual Farm Enterprise," The Western Economic Journal, II (Summer, 1964), 183.

on his crop. Another manifestation of the uncertainty is created by the instability of the supply of workers. A grower would be reticent to contract with a family or crew leader for only the minimum number of workers necessary if he feared some of these workers would be unproductive, whether children and/or unemployable adults, or might leave the farm before the harvest was completed. To protect against this uncertainty there is an incentive to "over-hire."

Fisher notes two conditions which must hold for employers to over-hire: workers must be paid on a piece rate basis, and employers must not bear the burdens of worker unemployment--for example, by being required to contribute towards unemployment compensation. The piece rates are necessary for they allow the employer to escape the effects of uneven productivity among workers, or of decreasing productivity for a given worker over time.

If employers had to bear the unemployment expense of workers, then over-hiring, which generally results in un- or underemployment for at least some of the work force, would increase costs directly with the size of the work force. This would tend to discourage the practice of over-hiring.[1]

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[1]If we assume a grower operates in a perfectly competitive product market, then his marginal revenue curve is horizontal. Fisher assumes non-wage costs of

Gallardo argues this general analysis must be tempered for a crop like pickles, since the harvest period is a continuous one involving multiple picks of the same field.[1] He argues the crucial decision is the "frequency" of picking. In addition there are other considerations peculiar to pickles, namely the relationship between work crew and the grade of crop. Still, the basic argument advanced by Fisher holds for pickles. The pickle grower and/or company has an incentive to over-hire, for the more workers available the more picks possible and lower grades will result. With fewer workers in Michigan following 1964 and the consequent higher labor costs, workers were assigned to the same pickle fields at longer intervals. The cost of harvesting small pickles simply became too great.

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harvesting are negligible and hence the marginal cost of harvesting would be constant at the going piece rate. Any decreasing productivity would be borne by workers. This then would allow a broad range of equilibrium output levels and similarly, broad ranges of work crews.

The validity of this analysis assumes a relatively abundant labor supply. If the labor supply were scarce, however, and growers had to incur recruiting costs and "holding" costs to assure a complete harvest, then the marginal cost curve would rise at some level. The larger the work force needed, the more difficulty a grower would experience in recruiting and holding workers--especially following the peak of the harvest. This would cause the marginal cost curve to rise more rapidly. A scarce labor supply therefore, would discourage the practice of over-hiring, even if piece rates were paid and growers did not bear the cost of unemployment.

[1]Gallardo, "Economics of Demand for Harvest Labor," 183-184.

Supply Considerations

In the discussion of worker behavior in the seasonally hired labor market of agriculture the debate turns on the elasticity of supply, whether the quantity forthcoming is highly inelastic with respect to wage changes or less so. There seems to be two accepted hypotheses: (1) members of the labor force respond very little to wage changes within agriculture, and higher wages may even encounter a negative work response in terms of workers supplied; (2) members of the labor force respond much better to economic stimuli from without agriculture than from within.

The argument for an inelastic supply schedule, in its extreme form, is the previously mentioned "stoop labor" argument.[1] In a more sophisticated form it approaches a "fund of workers" thesis, stating that only a given number of workers are available to do agricultural work. The hypothesis states that domestic agricultural workers are a fairly well-defined group determined largely by social and cultural conditions. Thus rather than a continuum of workers from high-paying jobs at the top end down to low-paying jobs, the aggregate labor force continues down so far and then

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[1]For a good statement of this see John Mamer, "The Use of Foreign Labor for Seasonal Farm Work in the U.S.--Issues Involved and Interest Groups in Conflict," Journal of Farm Economics, 43 (December, 1961), 1204.

drops off into a pit, the seasonal labor force of agriculture. As a result, when all the workers in this pit are employed higher wages cannot draw more workers in nor elicit much more energy from the workers of the pit. To complete the argument certain types of jobs, so-called stoop labor, are particularly disagreeable and therefore more difficult to fill with the set number of workers.

A more extreme form of this argument has been advanced by grower groups, who state that the number of workers available will not be supplemented much, if any, whether the bidding is done within an ongoing season when work patterns are established, or between seasons when workers are themselves bidding for the best work pattern.[1] Characteristic of these views are the following:

> Regardless of the incentives you won't be able to obtain a sufficient number of domestic workers for peak agricultural activities. These workers just don't exist.[2]

> There is no such thing as a stable domestic agricultural work force, much less an adequate reserve willing, able, qualified and ready to meet peak farm harvest work loads.[3]

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[1] Ibid., 1206. Interestingly, as Mamer suggests, the growers' alternative to a highly inelastic supply of domestic workers was an almost completely elastic supply of braceros; at the contracted price, generally as many braceros were available as the acreage decreed.

[2] C. L. Young, manager of the Tustin Hills Citrus Association and Vice-President of the Agricultural Producers Labor Committee, both of California, as reported in: "No Substitute for Mexican Nationals," California Citrograph, 45 (December, 1959), 37.

[3] John Zuckerman, Vice-President of the Council of California Growers, "The Migrant Worker in Relation to

> The information on domestic labor utilization is also of special interest. It is right and true that these domestics choose and obtain the choice activities within our industries. Besides may I call to your added attention neighboring crops which are rapidly absorbing available competent help of the kind who picked pickles in recent years. I estimate 7000 acres, more or less, of domestic blueberries within 75 miles of this community [Holland, Michigan], the harvest of which proves to be more desirable work than the harvest of pickles. These berries were developed during the past eight or nine years. During this time our ability to interest or hold local labor or itinerant competent groups has dwindled rapidly, even though the pickle wage during the past three years has exceeded blueberry wages per hour, as determined by MESC people.[1]

The logical extension of the argument is that serious production losses would result from any attempt to end the use of braceros, since no domestic workers could be found to replace them in the stoop labor tasks.

> Without BWI [British West Indies] cutters, all 11 sugar mills in Florida may have to shut down, putting about 5,500 domestic people out of work.[2]

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the Labor Problems of the Farmer," Western Interstate Conference on Migratory Labor, co-sponsored by the Council of State Governments and The President's Committee on Migratory Labor, Phoenix, Arizona, 1960, 35.

[1]Letter from A. E. Hildebrand, field manager of H. J. Heinz Company, to Ralph Strong, Regional Office, Cleveland, Ohio, U.S. Department of Labor, April 26, 1961.

[2]George Wedgeworth, President of Sugar Cane Growers Cooperative of Florida, as reported by Roger W. Benedict, "Farmers Dispute Labor, Government on Impact of Foreign Worker Ban," Wall Street Journal (April 26, 1965), 8.

A modified form of the argument has been advanced by a number of students of the market, including Fisher and Gallardo. Fisher states, regarding attempts to supplement the labor supply within the harvest season (though a similar logic can be extended easily for between the seasons):

> It is a widespread belief among growers in California that increases in wages are a highly inefficient means of increasing the supply of agricultural labor . . . farmers are more likely to turn to various programs of labor importation than to increases in the wage rate as a means of increasing the supply of labor. . . . But apart from the inherent desirability of securing labor for less, there is some substance in the growers' argument that an increase in wages will not of itself produce an increase in the supply of labor within the harvest season.[1]

Fisher continues, for an elastic response one of two conditions must hold: (1) available laborers in other occupations must be attracted into agricultural labor; (2) the existing agricultural labor force, whether employed or unemployed, must offer more labor. He finds the first condition "theoretically present but practically absent" due to the large differential between wages in agriculture and non-agricultural employments. As to the second, he finds the evidence indecisive but presumes the response may even be a negative one. The latter conclusion is built upon the assertions that (1) many women and children are in the labor force and thus

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[1]Fisher, The Harvest Labor Market in California, 16.

would drop out if the primary wage-earner could make more, and (2) many agricultural laborers have psychologically adjusted to a low level of living and thus developed fixed income objectives.

> The sum of all these tendencies suggests at the very least that higher wages would result in no increase in the supply of labor and quite conceivably could diminish it somewhat.[1]

Gallardo's conception of the supply schedule is S-shaped (see Figure 6). The "pit" of agricultural workers, their escape prevented by the forces of social discrimination and a lack of education and skills, makes up the bottom segment, SS'. The employment response of these workers becomes highly inelastic and even negative above some wage level w_1, the reasons based primarily upon Fisher's argument.[2] Above some wage level w_2

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[1] Ibid., 18.

[2] To illustrate this Gallardo posits an example of two agricultural industries, A and B, located in different areas of the country, with A's harvest coming prior to B's; there are 100 workers in each area. As wages increase, first A's workers will be drawn off welfare and into the fields. With further increases, B's workers will be drawn to A. If wages continue to increase, A's workers will make enough in the early harvest not to migrate to B and help in that harvest. And if B's workers make enough in their harvest, they too will have no need to migrate.

First, he assumes a positive preference not to migrate, which probably is true. Chronologically, however, his example seems weak, for how are B's workers to know, at the time of A's harvest, that if they skip the early harvest they will still make enough in the later harvest. Hence, they probably would migrate anyway, thus splitting the work in A among more workers and preventing A's workers from making enough to keep them from migrating. In any case, American agriculture is not

an outside group of workers would be induced into the labor force with a positive employment response, segment S"S; however he notes the height of w_2 may be practically unrealistic. Thus the relevant supply schedule is the lower segment, SS'.[1] Gallardo states:

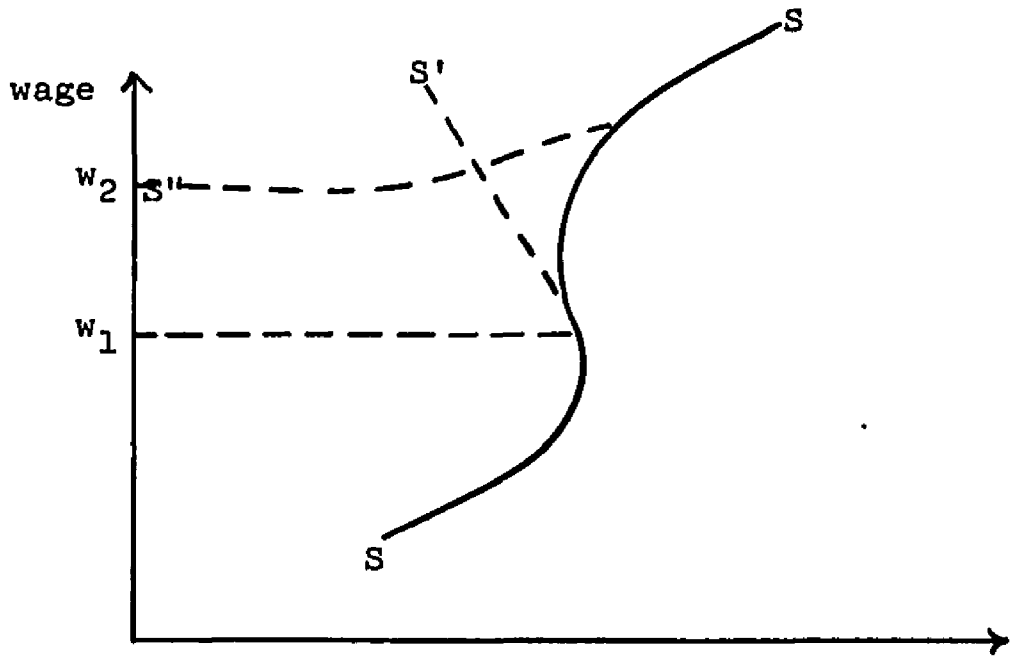

Fig. 6.--Hypothetical labor supply curve for harvest labor.

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now ready to pay wages high enough to make the example relevant, were it sound.

[1]There is one further group of workers he includes, the marginal workers made up of housewives and school youth of a given area, as well as the locally unemployed. Their supply schedule would be positively sloped until their number become exhausted and then would be vertical.

> The notoriously low earnings of harvest workers, the continued pressure of women and children in the fields, the large number of marginal workers, and the reluctance of workers in other occupations even when unemployed to shift to the harvest indicates a wage rate low on the supply curve, probably in the neighborhood of the lowest bend. Consequently, an immediate restoration of a free market, by termination of the foreign labor program, would confront farm employers with major problems of readjustment, unrelieved by any positive response of labor supply to the resultant rising wage rate. If termination came after planting time, a most probable effect would be substantial abandonment of crops; if before, considerable transference of lands to less labor-intensive crops, or out of production, and ultimately, mechanization and/or diversification.[1]

To Fisher's basic argument then, Gallardo adds the top segment to the supply schedule. As for the lower segment, the really important one at ruling wage levels, several observations can be made. Examining the first condition of Fisher, that laborers in non-agricultural occupations practically will not be drawn into agricultural work, he implicitly assumes full employment of the non-agricultural labor force, where the relevant alternative to agricultural work is a higher paying job. However for unemployed workers agricultural employment may promise higher earnings than welfare, especially if the period of unemployment may not have a forseeable termination.[2] Non-agricultural workers may not <u>want</u> to

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[1]Gallardo, "An Evaluation of Labor Policy," 76.

[2]See Fred H. Schmidt, "After the Bracero: An Inquiry into the Problems of Farm Labor Recruitment," Institute of Industrial Relations, UCLA, 1964 (mimeographed).

work in agriculture but they may be forced to as the best of the available alternatives.[1]

Fisher's second condition had two parts, workers marginal to the labor force would drop out, and there was a psychological adjustment to a low income status. With the average earnings as low as they are in seasonal agricultural work, it is doubtful that women and children will be dropping out quickly with an increase in wages above present levels; as noted, long run labor demand is sufficiently elastic to effectively retard large income advances from wage increases. That workers have become psychologically adjusted to a low income status is also doubtful. The traditional argument for a negatively sloped supply schedule states that wages above some level would not add to total earnings a utility sufficient to balance off the disutility of the added work; the

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[1]Many of the workers in the industrial centers of Michigan, e.g., Muskegon, Saginaw, Lansing, and Detroit, are former seasonal workers. When urban unemployment strikes, crops must still be harvested, and these workers and others reluctantly wend their ways to the fields, especially if the "good times" led to the accumulation of numerous items to be paid for on time. See some recent studies on migration which report an inflow into agriculture during slowdowns in non-agricultural employment, e.g.: Lowell Gallaway, "Mobility of Hired Agricultural Labor," Journal of Farm Economics, 49 (February, 1967), 32; Brian Perkins and Dale Hathaway, "Movement of Labor between Farm and Non-farm Jobs," Research Bulletin 13, Interregional Publication for the State Agricultural Experiment Stations, Agricultural Experiment Station, Michigan State University, East Lansing, 1966.

income effect of satisfactory earnings overcomes the substitution effect of work for leisure. At the income level presently existent among agricultural workers, it is difficult to imagine that they could be "satisfied" with their material comfort and not strive for more, especially with the knowledge of how the middle class lives, so easily gained from the widespread ownership of TV's--even among members of the "pit."[1] A worker may accept non-agricultural employment reluctantly, due to fear of failure or discrimination, but it is doubtful that he will reject a bone-fide offer of higher wages in an employment with which he is quite familiar.

In conclusion then, it is suggested that the negative inclination of the lower segment of the supply schedule on Figure 6 does not exist at the present wage levels or those comfortably above, and that the upper segment (S"S) may become feasible at a much lower wage level than Fisher or Gallardo expected, especially if there is unemployment within the non-agricultural work force. If the general argument of inelasticity is applicable at all, it would probably be at the national level, and less likely regionally where higher wages in one state or area within a state can pull workers from

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[1] In all fairness to Fisher the advances in the communications media are relatively recent, and thus any sociological discontent arising from a more widespread ownership of TV may have developed since Fisher completed his study.

other areas with relative ease, even within an ongoing season--so long as the increased wage is perceived as bone-fide.

The second general hypothesis is that workers respond better to non-agricultural economic stimuli than to economic incentives from within agriculture.[1] If workers, both those within and without the agricultural labor force, have a particular aversion to agricultural work, whether from the physical hardship or sociological and psychological connotations connected to it, then perhaps legitimate wage increases from within agriculture would not elicit supply responses, whereas similar stimuli from without would. As the comments above should indicate, a non-response to bone-fide wage increases from within agriculture is doubted. Perhaps the best way to evaluate the relative acceptance of wage responses from within and without agriculture is to assume the precise wage increases are the same and then posit worker behavior. If the "wage-package" in either employment is similar then the perceived seasonality of agricultural work would yield a lower yearly income; obviously the economic incentives are not the same. If the worker perceives the economic incentives as the same in terms of yearly income then it may be doubted if workers would

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[1]See Keith W. Bryant, "Demand and Supply of Agricultural Labor in a Period of Social Change," Journal of Farm Economics, 46 (December, 1964), 1248.

opt for non-agricultural work. Laborers traditionally employed in agriculture are unfamiliar with other work and may lack confidence, especially if the employment means moving away from the ethnic group or family. There is a period of acculturation which must follow a change of this nature and this will not be costless, either psychologically or economically; mistakes may be made which could result in paying more for certain goods and services than an acculturated individual would, for example in the incurrence of interest charges. The research of this thesis was not structured to test this hypothesis so no firm conclusions can be drawn. On logical grounds alone, however, the case for a more elastic employment response to a non-agricultural wage offer is doubted.

Wage Determination

Theoretical Overview

The jockeying forces of supply and demand converge upon selected allocators, whose function it is to discriminate between participants on either side of the market. As discussed above, the allocating mechanism for this market has been broken into two parts, comprising the "wage package."[1] The wage package then is

[1]In terms of relating supply and demand to the resulting wage bargain, Reynolds finds use of a concept like "wage package" subject to the danger of tautology;

continuously shifting to accommodate changes in the demand and supply forces, and the direction of shifting is toward an equilibrium or market-clearing wage package (w_2 in Figure 7).[1] This is the positive nature of the market mechanism and in no way does it guarantee normative satisfaction among members of either side of the market--demanders would like a lower package and suppliers a higher one--or among those outside the market.

In terms of positive analysis, shortages in the market arise when the wage package is less than the market-clearing wage package, or w_1, and surpluses occur when the wage package is greater than the market-clearing

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the market can always be in equilibrium by defining the package wide enough. This danger is mitigated if the package can be defined fairly closely, which was attempted above. See Lloyd Reynolds, The Structure of Labor Markets (New York: Harper and Bros., 1951), 225-26.

[1]The "wage package" is graphed along the vertical axis of Figure 7 and here the confusion comes in specifying the differences between w_1, w_2, and w_3; the same hourly wage rate could exist at all three but there would be higher non-wage provisions at w_3 than w_2 or w_1. To the grower these non-wage provisions are costs as much as the hourly rate, whether they are so perceived or not.

The horizontal axis is interpreted as "efficiency units" of labor rather than actual workers employed; an efficiency unit could be a healthy male worker of average productivity. Thus at w_1 an employer may have obtained n_4 workers, with the expectation of getting n_4 efficiency units, but in reality he will obtain only n_1 efficiency units, perhaps due to numerous women and children in the work crew.

Any geometric confusion hopefully will be overcome by greater analytical efficiency; and the danger is lessened since no numerical values are assigned to the axes.

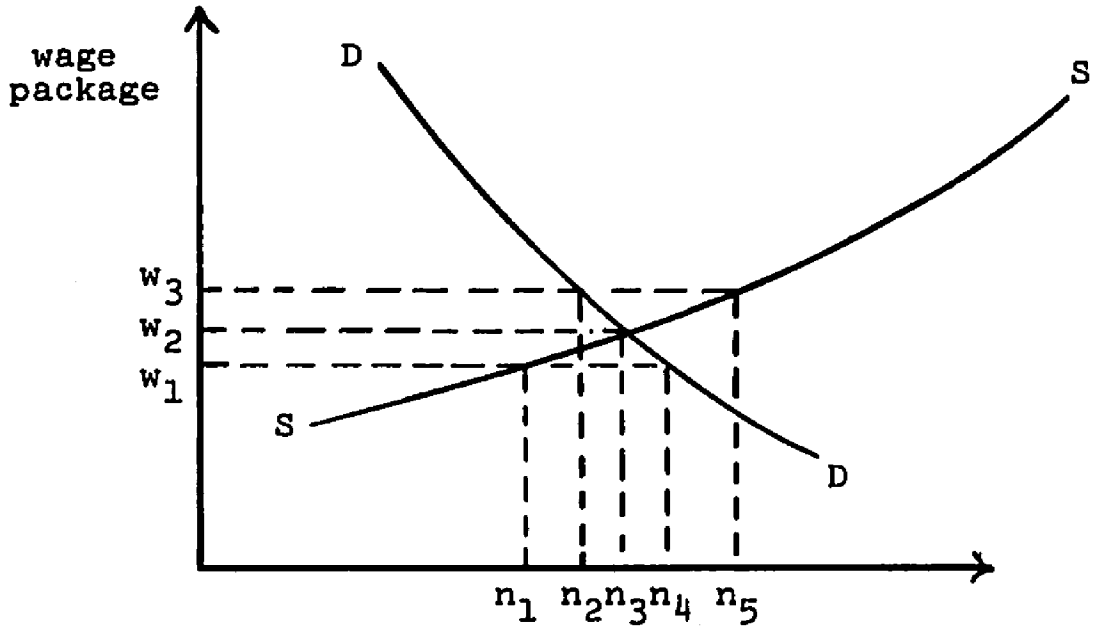

Fig. 7.--Demand-supply diagram of the harvest labor market.

package, or w_3. The forces of labor supply and demand are continuously shifting and hence the market-clearing wage package is shifting, though usually not in great amounts, and thus the wage package existing in the market will continually be at a position of short run shortage or surplus, but tending toward the market-clearing package. Since this market has been particularly blessed with various charges of shortage and surplus, it will be instructive to "play" with this analysis some and examine different cases.

A grower may want to obtain n_4 workers (of average productivity) at the price w_1, and being able to obtain only n_1 may claim there is a shortage. However this is a normatively imposed shortage, for what the grower really wants is the SS schedule to intersect the DD schedule at w_1, but the supply of workers is too scarce. This situation then is termed a scarcity of workers rather than a shortage.

A similar danger is to conclude on the basis of a low prevailing wage package that there must be a "surplus" of workers. Again, the positive meaning of surplus is that the wage package is greater than w_2. When w_2 is low, as it has been in this labor market, the positive term to convey the normative meaning is an "abundance" of workers.

As the market-clearing wage package shifts up from w_1 to w_2, say due to a leftward shift in the SS schedule, a grower may continue to pay the hourly rate paid at w_1 and "think" he is really operating there, when in reality he has had to exert more time and effort getting and holding workers and the actual wage package he is paying has shifted to w_2. The research indicated that growers often fail to view non-wage employment provisions as increasing the cost of workers.

A particular grower or growers' association may opt for paying a wage rate which some outside observers

would interpret to fall at w_3, but then discriminate between workers in terms of attitude or physical appearance. The worker in this case receives fewer non-wage provisions and the effective wage package lies at w_2. One grower contacted was known to pay $.10 to $.15 per hour more than other growers in his area, but he also reserved the freedom to dismiss workers when they gave him a hard time.[1]

A concerned citizen may complain about w_2 being too low and join with other citizens to enact a legal minimum wage at what they believe to be w_3. Having to pay a wage rate this high, growers may simply reduce the remainder of the wage package and pay an effective wage package of w_2. If the concerned citizens continue to protest and achieve minimum standards for housing, health care, and most of the other non-wage provisions, and the effective minimum wage package actually becomes w_3, then employment will be cut to n_2, creating a surplus of n_5-n_2. This surplus will exist either to exert a downward pressure on the wage package in the geographic area of the minimum wage, for example workers living in

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[1]The tautological danger here is recognized. The research also turned up examples of growers and/or grower associations which paid more, both in terms of wage and non-wage provisions, than the observed market-clearing wage package. This observation, more in line with the broad "range" of roughly equivalent wages found in Reynold's study, seems to be the exception in this labor market.

a condemned shack even though the grower warns them about the law, or will find workers spilling over into other job markets or other areas of the agricultural job market and depressing the wage package there.[1]

As noted, the market-clearing wage package w_2 is a moving package reflecting changes among both labor demand and supply forces. For many non-agricultural labor markets, the wage package (however defined) has been moving up, oft-times quite rapidly. This phenomena can come about from a rightward shift in the demand schedule for a given supply schedule, a leftward shift in the supply schedule for a given demand schedule, or the demand schedule shifting to the right faster than the supply schedule shifts leftward.

In the agricultural labor market there is concern that the market-clearing wage package has not been moving up quickly enough. Studies have shown that the supply schedule has been shifting leftward reflecting a decreasing number of workers participating in the market, though the rate of this shift is highly dependent upon the job opportunities in the non-agricultural labor market. But the indications are also that the demand

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[1]Examples of such cases can be cited. Most recently the implementation of the federal minimum wage law in 1967 may have created a wage package of w_3 in several southern supply states and pushed workers north into Michigan in a search for work.

schedule has been shifting leftward at a rate roughly equivalent to the rate of change in the supply schedule, due to changes in agricultural technology. If one could construct a long run demand schedule for agricultural hired labor, it might resemble that in Figure 8, where D_1, D_2, and D_3 are short run (within season) demand schedules and DD is the long run (between season) demand schedule.

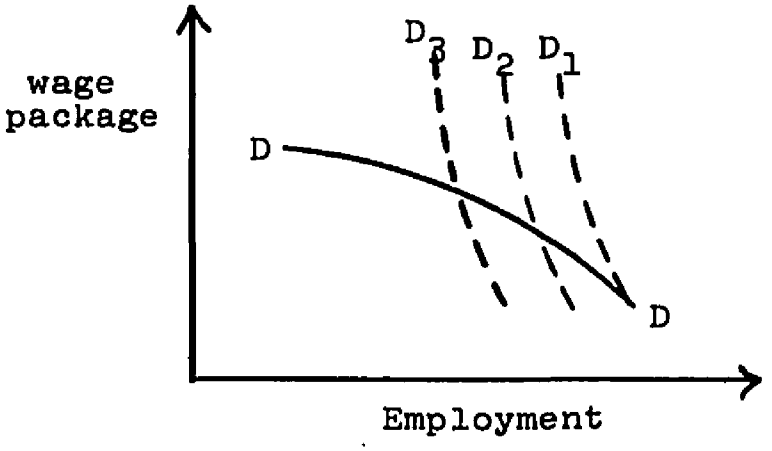

Fig. 8.--Short run and long run labor demand curves for harvest labor.

The speed of adjustment in a given labor market from one market-clearing wage to another as a result of some supply or demand schedule shift will turn largely on the "fixity" of the conditions underlying the separate

schedules.[1] The factor generally considered least variable in the short run is the capital stock underlying the labor demand schedule. On the supply side, the accumulated skills at any one job, as well as vested economic and social interests in an area and/or job, determine the willingness or unwillingness of workers to move quickly. Thus the adjustment process of workers employed may respond only slowly to wage package changes.[2]

In the agricultural labor market the rate of response appears to be more rapid than in other markets. For many growers the plant (or firm) is fixed only for one season, the plant being the field in which the labor-using crop lies. Fixed capital beyond this, perhaps tractors, planters, cultivators, or irrigation rigs, can be transferred to the production of other crops and would not retard an adjustment away from a high labor-using crop. Thus if the supply of labor were scarce one season then adjustment could be achieved easily by the following one. This would be the case for many Michigan pickle growers.[3] For some

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[1] J. R. Hicks, The Theory of Wages (New York: St. Martin's Press, 1963), 18-22.

[2] In addition there are often institutional constraints retarding the adjustment process, e.g. unions may slow down the laying-off of workers following a decrease in product demand.

[3] The pickle processors of Michigan have much greater fixed investment, however, which would seriously retard the adjustment mechanism: to the extent though that acreage could not be transferred efficiently to other areas within the U.S. (see Chapter V below).

growers there is a larger fixed investment in given crops. Fruit and berry growers have fixed land investments, and often specialized machinery applicable to certain crops may build in fixity.

Among agricultural workers there evolves far fewer "job rights" than in other labor markets due both to a lack of high skill requirements and a lack of legal protection to organize. Even if workers were to gain social and/or economic interests in a given area, the lack of job protection would prevent these factors from retarding the employment response to a changing market-clearing wage package.

Also absent from the agricultural labor market are the many and diverse institutional intrusions to the market mechanism which slow down adjustment. As noted these workers possess less legal coverage. In addition to exemptions from the NLRA, numerous other federal and state laws are less demanding concerning agricultural labor, for example, local welfare residency requirements. Unions are notably absent from this labor market, and few job security provisions have grown up in their absence.

One final characteristic of this labor market lends to its rapidly adjusting nature. In the day to day workings of the market there are numerous opportunities for hiring and firing to occur: a worker gets drunk or messes up the field; a family may not show up Saturday morning

as requested; chronic sickness often plagues some of the workers and there may be a number of sick calls; the grower may have his buying source terminated. Much of this is due to the lack of institutional rigidities in the market. Much is also due undoubtedly to sociological and psychological factors: the culture of poverty mentality seemingly would create less responsible workers, and poverty conditions would prevent them from more productive involvement. In addition, when the remuneration is so low, opportunity costs need not be very high to encourage worker turnover; workers may not feel the wages require holding back complaints or being overly careful about behavior.

As a result of these characteristics, a rightward shift in the supply schedule, say from a surge of free-wheelers into an area, can push the wage package down within a few weeks or even days. Conversely, a scarce supply of labor will find growers pirating other growers in their area and especially in near-by areas, and will find workers jumping commitments with other growers, and the wage package will be bid up quickly to the new market clearing level.

Higgling in the Market

Others have written extensively on the rather infamous nature of the exchanges in this market. The

early-morning "shape-up" probably is most familiar.[1] Another more informal exchange occurs during the winter months in the southern supply states, as recruiters circulate among workers.[2] The aspect of the higgling process between workers and growers least discussed is the day to day, highly informal and unstructured exchange operating throughout the season. To illustrate this exchange, two hypothetical market situations are assumed, one of abundant labor supplies and one of scarce labor supplies during the Michigan migrant season.

The abundant market: Assume the seasonal labor market begins in equilibrium, and then into the season a number of free-wheelers appear and seek work. Initially growers are satisfied with their work force and schedule the production process accordingly. In that the in-coming free-wheelers receive no great fanfare, their presence may not be known by most growers. Slowly, however, growers realize labor is not quite as scarce as earlier: the Farm Labor Service may call wondering if more work is available; workers may call from other parts of the state wondering if there is work, or they may knock on a grower's door requesting work; or employed workers may report they have

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[1]See Fisher, The Harvest Labor Market in California, Chapter 3, for a discussion of examples from California. Reul, Where Hannibal Led Us, Chapter 26, has a similar discussion taken from Florida.

[2]See Carey McWilliams, "Mexicans to Michigan," Common Ground, 2 (Autumn, 1941), 5.

friends or relatives willing to work. The reaction can be varied. Some growers may decide to handweed the field earlier scheduled for machine cultivation, offering a lower wage package than they earlier expected to pay. If it is harvest time then less acreage may be machine harvested. In this case the additional workers will be thrown into the field with those hired earlier, due to the expandable nature of the labor demand.

As more labor becomes available the growers' work schedules slowly become spread among more and more workers. Some workers may complain, but the growers have little incentive to take notice since other workers are available to replace any that quit. Most growers will hold to winter commitments and keep the early labor force, although there will be some subjective weakening of non-wage benefits.[1] A few growers will forget earlier commitments and openly play-off their employed workers with the new arrivals for a lower wage package. Drawing from recent experience, probably the most crucial area of discrimination will be a reduction in the completeness of the work pattern, even if hourly wages suffer no change at all. With reduced pressure to retain previously contracted workers, growers will exert less energy to keep

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[1]Even the sympathetic employer who never would betray his workers must give in some. His competitors will be paying lower labor costs and ultimately be able to undersell him.

these workers busy at all times. And even if a given grower tries to arrange a complete work pattern, say by contacting other growers when his operations are slow, the chance of finding other growers needing labor will be poor. The end result for the workers is a smaller wage package and less income for the season's effort.

The scarce market: Assume again that the seasonal labor market begins in equilibrium, but then the supply of labor becomes quite scarce. This may occur for a variety of reasons: growers who did no early recruiting in anticipation of sufficient free-wheelers will be caught short and start to bid for workers; some growers with poor records in worker treatment may find worker commitments falling through; recruiters from other states enter to entice workers; workers remain only until the peak harvest is complete and then leave.

Just as before growers slowly gain awareness of this. Their neighboring growers may complain of a shortage, or workers may tell of better offers elsewhere and wonder what they should do, or the Farm Labor Service may call to see if there are any extra workers to fill needs in other areas of the state. With the knowledge that labor is scarce growers may respond in numerous ways. They may offer a higher wage rate, but more likely will improve the non-wage provisions. The work pattern will quickly fill up to protect against any unrest from idle

days, an unrest which might well cause workers to pack-up and leave overnight for a better opportunity. In this case, the wage package to the worker is enhanced.

In both the above hypothetical situations there is one factor working to slow the adjustment process, the dynamic element of discounting for future years. In an abundant market, a grower may want to break his commitment with some workers but be reluctant to do so if a scarce market should be expected in the coming season. In this case he would want to nurture his "nucleus."[1] In like manner, workers also want to protect their future job pattern and may be reluctant to "jump" a grower in a scarce market for fear a more abundant market the following year may find the grower unwilling to hire them. Historically, in Michigan as well as other areas, the workers have had to discount far more than the growers, since the labor supply each year was relatively abundant.

Imperfections in the Market

In his microeconomic study, Reynolds dismisses the conception of a "perfect labor market" as a normative model unworkable in practice.[2] Rather, he chooses to

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[1]This is the term used in the trade to describe a group of workers upon whom the grower can depend to show up each season and, if necessary, bring other workers. The "nucleus" must be maintained as a security factor when the labor supply is scarce.

[2]Reynolds, The Structure of Labor Markets, Chapter 8.

focus on the imperfections and finds the greatest one to be insufficient knowledge among workers. Thus the perfectly designed competitive model of workers flowing to employments on the basis of calculated wage differentials is brought under question.

The seasonal labor market of agriculture has been charged with numerous imperfections, notably poor worker knowledge of the available offerings. This charge brings to mind the Steinbeckian impression of workers hopelessly wandering from farm to farm, not knowing whether work will be available. Compounding this image is that of the employer greedily advertising for many workers and much work while subtly rubbing his hands in the expectation of a deluge of labor and consequent low wages. Though these images possess sufficient historical documentation to have justified public concern, currently they are somewhat extreme, though limited examples can be found. Workers who have traveled the migrant circuit before often make phone calls to selected growers before driving into an area. And when in the midst of one crop's harvest, they may be calling around to seek the most profitable crop to work next.

Another common imperfection in many labor markets is that of immobility. This one does not seem to plague the agricultural labor market internally but surely does externally. Workers are highly mobile among areas and

jobs within an area. To move out of the market and into other employments, however, is more difficult. Most of a worker's sociological reference points are in farm work, and the jump to steadier non-farm work with the often attendant requirement to live in a city can be quite difficult. This immobility is lessened when friends or other family members have gone before.

Some might consider the unstructured nature of the market an imperfection, for example, the casual regard for verbal contracts. On the basis of low wages to conclude the market must contain numerous imperfections is erroneous. A perfectly functioning labor market with an abundant supply will yield low returns. Indeed, the seasonal labor market of agriculture probably is more perfect than many, with a high mobility rate and unusual degree of knowledge.[1] A perfectly functioning market positively says nothing about its normative acceptability.

Unilateral Decision Making

Several studies have pointed to the unilateral decision making process in this labor market, with the

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[1]Workers and growers can always refer to a Farm Labor Service office where relatively accurate information is available for various regions of the country and areas within those regions. In addition, there is a fairly reliable grapevine among migrant workers, supplying crop and wage information. On the efficient nature of the grapevine see Harlan Padfield and William Martin, Farmers, Workers, and Machines (Tuscon: University of Arizona Press, 1965), 22, and Schmidt, "After the Bracero," 78.

grower(s) making the wage decisions and the workers responding to them. Since, as Fisher notes, the grower faces the harvest as an "all or none" operation with the output fixed and a direct trade-off between wages and grower profit, there is great incentive for growers to control labor costs. Thus the practice of growers setting wages has become conventional wisdom. In his study of labor relations in agriculture, Fuller notes: "Unilateral activities are, therefore, the major portion of the meager content of labor relations in agriculture."[1] The more notorious forms of wage setting have come disguised under the monopolistic form of grower employment associations. "It is probable that in no sector of industry has employer wage agreement begun to approach its development in agriculture."[2] The professed reason for the formation of these associations has been the efficient obtaining of workers, but it is claimed they provide opportune conditions for discussing the wages growers would find convenient to offer. It should be noted, however, that even without associations growers easily can discuss the wage package they "would like" to pay; almost every farming area has a coffee shop or similar location where growers "hang out," and in addition with mutual interests, they often socialize together.

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[1]Fuller, Labor Relations in Agriculture, 5.

[2]Fisher, The Harvest Labor Market in California, 97.

From a social standpoint, the only relevant case of public concern over unilateral wage setting is when the wage package established is less than the market clearing wage package, or w_1 in Figure 9. At this wage package workers are being denied the market clearing wage package w_2.[1] However, the analysis also suggests that not as many workers would be available at w_1 as growers would wish to hire, and there would be an upward pressure on the wage package, though perhaps not the wage rate. It is also possible for the grower established wage package to be set at or above w_2, especially since historically the labor supply has been so uncertain and growers acting in concert may have no real knowledge of where the supply schedule cuts the demand schedule when setting wages.

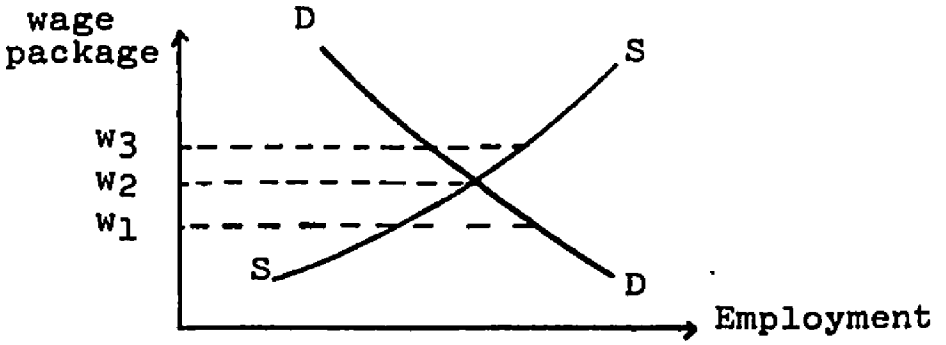

Figure 9.--Hypothetical supply-demand interaction in the hird labor market of agriculture.

[1]It should be noted, however, when growers meet to establish wages the pegged thing is the wage rate. It is far more difficult to peg the non-wage conditions of the wage package, and this allows growers considerable leeway to vary their offering while maintaining adherence to the pegged wage rate.

The current study has found the case for employer wage setting at w_1 an unlikely one. Agriculture is characteristically a competitive industry and such a phenomena as wage setting at w_1 seems inconsistent with competitive behavior. For grower A to agree to w_1 means he may not obtain the labor he desires, and consequently may suffer a poor harvest. With the psychological and economical importance surrounding the harvest period, it is unlikely that grower A would stand for such a situation (whether previously agreed to or not) and would bid labor away from others to assure his harvest.[1] The research turned up good evidence of growers pirating the labor of one another.

Examples of established wage "rates" remaining constant over long periods of time and among numerous growers could be explainable if the "pegged" wage rate were set at or above the market-clearing wage rate. There would be an incentive for growers to do this, as noted above, to obtain a choice of workers and thus discriminate on the

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[1] "With the harvest already underway, when each farm operator is concerned with his own individual situation, each pursues his own strategy of reducing uncertainty. And he does this without much conception of over-all labor supplies or demands in the area and hence of the interacting consequences of one employer's actions upon others." Fuller, Mamer, Viles, "Domestic and Imported Workers in the Harvest Labor Market," 31.

basis of non-wage factors.[1] This would explain reports of some growers paying less than the pegged wage, since they would be paying a wage "rate" more in line with the market-clearing wage package.[2]

Bracero Program

Though employer associations may not have been wholly effective as wage setting bodies directly, they have been able to establish wages indirectly simply by expanding the supply of workers. Thus on Figure 10, if growers want to pay w_1 and obtain n_1 efficiency units of

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[1]Reynolds records a similar phenomena in his study of the New England manufacturing labor market, with some firms paying a high wage and others a low wage for similar work. He would not accept the concept of a market-clearing wage package as some narrowly defined amount, but rather views a wide band of market-clearing "rates," the width largely determined by immobility and lack of knowledge among workers. Reynolds, The Structure of Labor Markets, 230-40.

[2]"Apart from the issue of whether such wage schedules are fair and equitable, it is obvious that one of the consequences of unilateral wage administration is largely to eliminate wage competition as a factor in labor procurement." Fuller, Labor Relations in Agriculture, 21. The present study takes issue with this observation, based on the recent experience in Michigan. Unilateral wage administration that results in fixed wages over time, the relevant case, is possible only if the established rate is set at or above the market-clearing rate. With the large worker supplies of the past, it is quite conceivable that such could be the case. One way of testing this would be to identify non-wage forms of allocation and observe how much variation there was in these allocators during the period of purported wage setting. If there was considerable activity then this could infer that wage rates were set above a market-clearing wage rate and the allocation of workers made on the basis of non-wage discrimination.

employment, they can do this by supplementing the existing supply SS with additional workers, making an effective supply schedule of S'S'. Quite simply this has been the rationale underlying the importation of foreign labor. Growers have not wanted to pay the wage requisite to employ domestic laborers and have won political sanction to supplement the domestic work force (SS) with foreign workers. To support their claim they have argued that SS is nearly infinitely inelastic, the stoop labor argument, and hence paying w_2 would reek untold havoc on agricultural production. This analysis is consistent with that of Fuller, Mamer, and Viles mentioned above,

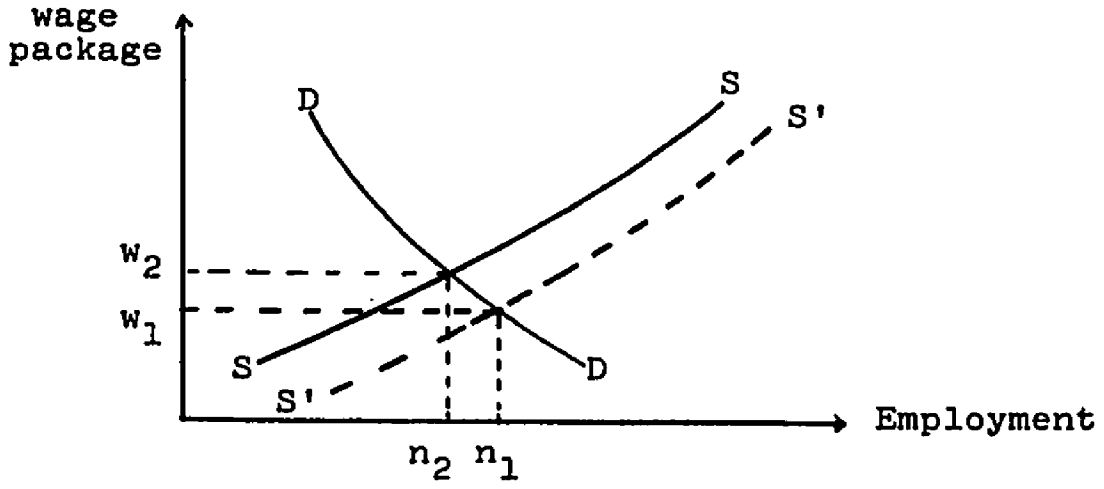

Fig. 10.--Hypothetical supply-demand interaction in the hired labor market of agriculture showing a shift in supply.

with their stress that the presence of braceros gives growers more certainty of labor supply.[1]

The bracero program has come under other charges as to its effect on the labor market. Mamer suggested it may have stratified the market, isolating selected crops in each area as "bracero work."[2] Hence, domestic workers would avoid these crops in setting up their work pattern due to a social stigma attached to them. Analytically, this would mean the supply of domestic labor available for given "stoop labor" crops, in which large numbers of braceros were employed, would be much more inelastic than for non-bracero crops. The present research suggests that any sociological determination of supply elasticity is quite short-lived. In fact, the more likely case is

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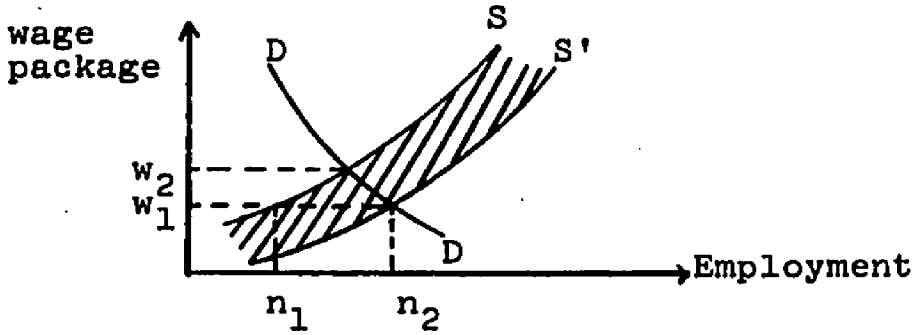
[1]Fuller, Mamer, Viles,"Domestic and Imported Workers in the Harvest Labor Market." Graphically, a condition of uncertainty might be as seen below (modification of Figure 10). The crossed area would indicate a range of uncertainty; at w_1 the grower could not be certain whether n_1 or n_2 would be available. He can be quite certain that labor can be obtained up to SS but beyond that uncertainty arises. The presence of braceros removes the uncertainty beyond SS to S'S', and also maintains $w_1 < w_2$.



[2]Mamer, "The Use of Foreign Labor," 1207-08.

that domestic workers avoided the bracero crops due to a poor earning potential in them, and once braceros were pulled out and the earning potential returned, the supply response of domestics became as elastic in those crops as in others.

Traditionally foreign labor programs have stipulated that foreign workers could not be imported at less than the prevailing wage rate in the agricultural labor market, for to do so would harm the wages of domestic workers.[1] Thus referring to Figure 10, assume that S'S' was the supply schedule of domestic labor at some point in the past and each year a natural attrition of workers out of this market occurred so that at a more recent point in time SS became the supply schedule of domestic workers (with a market clearing wage package of w_2). The availability of foreign workers during this entire period would maintain S'S' as the relevant schedule and w_1 as the prevailing wage package. Wage package w_1 would contain the prevailing wage initially and as long as braceros were supplied in unlimited amounts this prevailing wage would continue; the presence of braceros would tie present

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[1]The preference for administering the foreign labor program largely in terms of wage "rates" neglected the role played in this market by non-wage allocators. Thus to allow the importation of braceros at the prevailing wage, w_1, with the expectation that domestic workers would not be harmed, was erroneous logic, for growers could discriminate in terms of non-wage conditions of employment, and the wage package would fall.

wages to a historical figure, that ruling when they were first admitted.

The initially prevailing wage, w_1, could increase if (1) braceros were not available in unlimited amounts, or (2) a wage above the previous season's prevailing wage were established as the minimum contract wage for obtaining braceros. The second condition has been the one used to achieve wage increases. Starting in the late 1950's and into the 1960's, the U.S. Department of Labor began to enforce minimum contract rates greater than the prevailing wage--"adverse effect" wages--while continuing to enforce non-wage conditions like housing and work guarantees. The effect of this on Figure 10 would be to move w_1 up towards w_2 and thereby reduce the number of braceros that growers would desire to import, as n_1 approached n_2. If the cost of obtaining braceros were a wage package greater than w_2, then presumably no more would be imported. Presumably, this is what happened in Michigan following 1964.

Role of the Farm Labor Service

In the context of the above discussion, what role should a public employment service play? Ideally, the goal in any labor market is to reduce the imperfections in it. Therefore, a major role of public policy should be efforts to enhance knowledge among growers and workers

of the respective offerings and conditions of work, and to enhance the mobility of the participants of the market. The information function should have a positive and negative side, to provide greater knowledge as well as prevent erroneous knowledge. The mobility function should be seen in relation to the entire economy and efforts should be made to enhance mobility both within the agricultural labor market and between it and other labor markets.

If a public body in this labor force were biased towards growers then its behavior would reflect attempts to maintain S'S' in Figure 10. This might be done openly by helpful efforts to facilitate bracero importation--for example, by off-hand acceptance of the growers' word on the prevailing wage from the previous season. It might be done tacitly by a failure to help domestic workers climb out of the labor market. If the public body were biased towards domestic workers then its behavior should be to stifle the inflow of braceros by tightening the conditions governing importation, as well as aiding efforts to push the supply curve leftward. Biases also could be displayed in more subtle ways, say by performing the information function more adequately for one set of participants than the other.

CHAPTER IV

ANALYSIS OF HYPOTHESIS

With the important institutional and theoretical background of Chapters II and III presented, the analysis of the hypothesis can proceed. The expiration of PL-78, and the failure of the Michigan pickle industry to qualify for foreign workers under PL-414 in the 1965 season, cast numerous Michigan employers into the new experience of recruiting large numbers of domestic workers. Figure 11 presents the situation under examination, where DD is the demand for domestic farm labor in Michigan pickles. S'S' was the supply curve of labor when the braceros were available. The question becomes, what was the relevant supply curve of domestic labor following 1964, SS or S"S"? In Chapter III, an intuitive case against the extreme stoop labor hypothesis (SS) was argued. The purpose of the analysis is to determine whether the experience in Michigan supports the intuitive refutation of the hypothesis.

The analysis of the hypothesis in this chapter will consider two questions, the wage change for all Michigan crops following 1964, and the supply response of domestic workers in Michigan pickles to higher wage

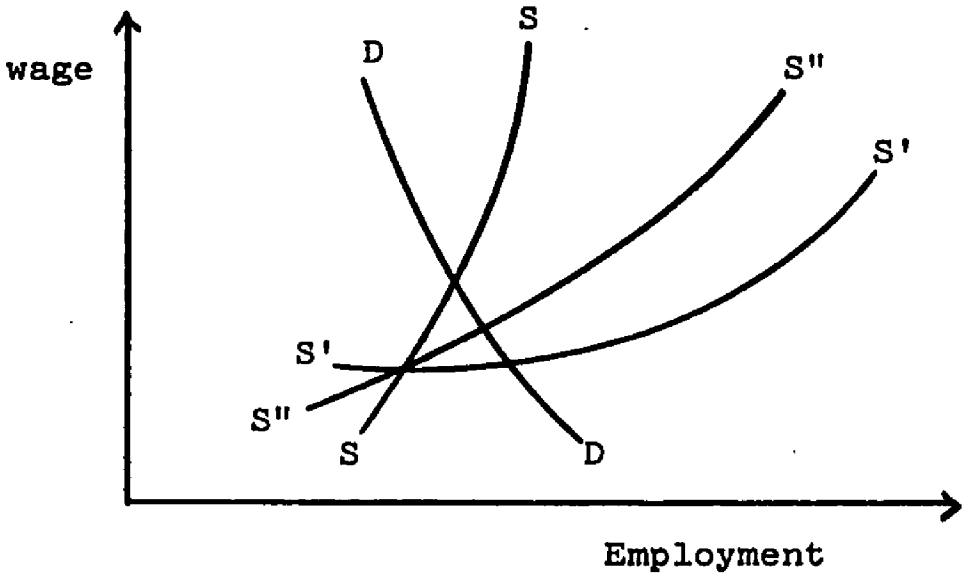

Fig. 11.--Demand for and supply of seasonal workers in Michigan agriculture.

offers. The following chapter considers the acreage changes and capital substitution resulting from the labor market adjustment. In order to consider these questions, however, it is necessary to review two "exogenous" factors affecting the agricultural labor market during the period under examination: weather and legislative changes.[1]

[1]Technological changes, usually considered exogenous to economic adjustments, have been discussed in Appendix I.

Exogenous Factors

Weather

Capricious weather behavior can affect the demand for hired workers fairly substantially, either by providing a bumper crop and a large demand for labor, or by ruining crops in the field and thus eliminating any labor demand. To help examine the effects of weather, Table 7 shows the annual production of selected Michigan crops for the period 1963 to 1967 in percentage figures. Each figure is obtained by taking the total production for the given year and dividing it by the average production of the five year period terminating with that year. This is done to control for the effects of weather and production trends. For example, a crop with percentage figures consistently over 100 per cent would either be an expanding crop for the state or have experienced a succession of good weather years.

In 1963 the weather was unusually severe with a late spring frost. Tart cherries, then the largest employer of migrants, suffered the worst production loss in modern history, with only 45 per cent of the five year moving average production harvested. Such a production loss harmed growers and workers alike. Workers intending to harvest Michigan cherries had to find alternative

TABLE 7.--Annual production during 1963-67 of selected Michigan crops, as a percentage of the five year average production, with the given year as the terminal year of the five year average.

Crop	1963	1964	1965	1966	1967
Asparagus	87%	101%	115%	101%	111%
Strawberries	102	105	101	82	91
Tart cherries	45	185	108	53	49
Sweet cherries	53	144	134	95	100
Pickles	118	99	79	103	99
Onions	104	94	108	89	92
Proc. Tomatoes	88	85	101	74	120
Grapes	65	130	134	83	73
Apples	93	120	106	102	81
Sugar Beets	103	120	95	98	--

Source: USDA, Statistical Reporting Service, cooperating with the Michigan Dept. of Agriculture, Michigan Agricultural Statistics. The data for 1967 are obtained from various publications of the USDA, SRS.

crops. Reports during the season told of workers remaining longer in the raspberry harvest, cleaning the bushes more carefully than usual: a boon to raspberry growers but an economic loss to workers.

Sugar beet production was 103 per cent of the five year average, despite the fact that 1963 was the first year in over a decade that this industry did not rely upon braceros. Expecting termination of the bracero

program the beet industry voluntarily discontinued use of braceros without a serious impact on production.[1]

Weather conditions during both the 1964 and 1965 seasons were generally favorable with no damaging late spring frosts to harm the cherry and apple buds. The tart cherry crop of 1964 was the largest ever for the state. Pickle production in 1964 was 96 per cent of the 1963 production but 99 per cent of the five year average.

In 1965 all crops fared well except pickles.[2] Part of the decline in pickle production could be explained by a lower planted acreage, which was 69 per cent of the five year average, 1959-63. In addition, part of the production decline in 1965 was due to unproductive or

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[1]According to the Michigan Farm Labor Service, peak employment in sugar beets during 1962 was 5,400 workers, 846 of whom were braceros. Thus, braceros constituted a much smaller percentage of all workers in sugar beets than was the case in pickles in 1964-65, and this made the adjustment to an all domestic labor force less burdensome. In earlier years braceros constituted a larger proportion of total employment in sugar beets. In 1959, 3,400 braceros worked at the peak of 6,400 workers, and in 1961, over 2,000 Mexicans were employed. Thus the beet industry phased itself out of bracero employment over a period of three to four years from a level of dependence around 50 per cent of the beet labor force.

[2]A complete understanding of pickles in 1965 cannot be seen solely in a production figure, which is a weight measurement. The value of pickles to growers and often workers (when paid a percentage of crop value) is not a function of gross weight but of the distribution of gross production among the separate grades of pickles. Much of the 1965 production was made up of larger pickles (cheaper grades) because of a shortage of workers to pick the fruit at smaller sizes.

insufficient labor. Contributing also was some dry weather in late June and early July in the Saginaw area. It is possible that "weather damage" would not have been as severe if sufficient labor were expected by growers. For example, if a grower had an irrigation system and had to allocate its use to several crops, the bean and sugar beet fields might be expected to get watered before the pickle field if this grower did not expect many pickle workers.

In 1966 and 1967 late cool springs retarded the development of several crops and thus limited production. Pickle production in 1966 was up from the previous year, however, recovering from the below-trend year in 1965. Tart cherry production was again less than 50 per cent of the five year average in 1967. The 1967 season also experienced some very wet weather in the east-state area during June and July, which cut into the pickle yield. Even so, pickle production was 99 per cent of the five year average for the state as a whole. Hidden within this figure however was the lowest yield per acre for the state since 1958.[1]

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[1]The weather was not entirely to blame for the dismal yield per acre. Some other causes were: a state-wide attack of angular leaf spot; increased use of mechanical harvesters, which reduce per-acre yield given the present state of plant technology; increased rejection of green stock by processors who experienced an early bumper yield in the southern states.

In summary the effects of the weather may have been to limit labor demand by all crops fairly substantially in 1963, increase it more than normal in 1964, affect it little if at all in 1965--perhaps also in 1966, and probably lessen labor demand in 1967.

Legislative Changes

The major legislative change during the period was the termination of PL-78 in December of 1964. At the federal level, several laws were passed which affected farm workers. The Area Redevelopment Act of 1961 and the Manpower Development and Training Act of 1962 made only small impacts on the agricultural labor market. Some funds were expended directly upon seasonal labor, and in addition farm workers were helped indirectly when other groups were retrained.

The Farm Labor Contractor Registration Act became law in 1964.[1] This law sought to register all contractors of seasonal labor in order to eliminate such practices as dangerous means of transportation, inadequate insurance coverage, and exploitation of workers by crew leaders. Enforcement of the law has been difficult due to the

[1]Act of September 7, 1964, 78 Stat. 920, "The Farm Labor Contractor Act of 1963." For Michigan the 1965 season was the first for which this law applied. For a review of the law's first year of applicability, see William S. Frank and Herb S. Denenbery, "Farm Labor Contractor Registration Act is One Year Old," Employment Service Review, 3 (January, 1966), 37.

unstructured nature of the recruitment process. The probably effect of this law has been to remedy some recruitment practices, but it is doubtful that it has affected supplies of available workers.

On September 23, 1966, President Johnson signed an amendment to the Fair Labor Standards Act, extending minimum wage coverage to farm workers. The first year this law applied was 1967 when the minimum was set at $1.00 per hour: to be raised to $1.15 per hour in 1968 and to $1.25 per hour in 1969.

Finally, funds were available through several other federal laws which could benefit farm workers. The 1962 Migrant Health Act, the 1964 Economic Opportunity Act, and the 1964 Housing Act all provided funds to aid migrants in securing hospitalization, medical care and day-care service, and cheaper loans to growers for constructing improved worker housing. Yearly appropriation changes affect the amount of this help.

At the state level legislative action also affected the agricultural labor market. In 1964 the Michigan legislature passed a minimum wage law covering farm workers, effective in 1965.[1] The provisions did not cover payment by piece rate however. Consequently

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[1]This law, Public Act 154 of 1964, set the minimum at $1.00 per hour in 1965, $1.15 per hour in 1966, and $1.25 per hour in 1967.

effective application of this law was delayed until the 1967 season when a set of minimum piece rates to yield the $1.25 per hour minimum were attached to the law. Whereas the federal law covered those employers who used over 500 mandays of labor in any quarter of the previous year (most seasonal employers), the Michigan law applied to all employers of four or more workers at any one time. This assured virtually complete coverage of Michigan employers of seasonal agricultural workers.

A state workmen's compensation law applicable to agriculture was passed in 1965, to be effective in May of 1966. The law covered all employers who used three or more workers, hourly or salaried, for 35 hours per week, and for 13 weeks of the previous 52 weeks; this excluded most migrants because of the 13 week stipulation. The effective date of the law was postponed until May of 1967.

A migrant housing law was enacted in 1965 to take effect in the 1966 season. This law required inspection of all migrant housing in the state and established minimum housing standards. The law is enforced by the State Department of Health, which has the power to force compliance by court action. The usual enforcement procedure has been to visit the housing, inform the owner of infractions, and then check back. Upon returning, if no remedial action has been taken the employer is brought before a local court and fined a small fee. This law has

served fairly effectively to improve the quality of migrant housing in Michigan as well as to raise the cost of workers.[1]

The combined effects of both the federal and state laws undoubtedly has been to reduce the supply of workers somewhat, for example through retraining, and to reduce the quantity of workers demanded by raising labor costs to growers. The net effect could not be estimated. In addition, the laws probably have helped make the living conditions of the migrants a bit more tolerable.

Examination of the Wage Change

Expected Impacts on Wage Rates

The stoop labor thesis argues that the supply of domestic workers available for agricultural work is a relatively fixed amount, and higher wage rates within

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[1]The law lays down basic standards for all employers who house five or more workers. Upon an initial inspection if any violations are recorded, the grower is given a temporary license for three months. If no provisions of the law are found fulfilled the grower can obtain a provisional license contingent upon his agreement to rectify the situation. A full license is issued to growers meeting all of the laws' requirements, and these must be renewed annually. Punitive measures include court injunctions and fines, the amount of which have not been large but serve as harassment, and thus do affect change.

During the 1966 inspection period 3.3 violations per camp were found, and 39.9 per cent of the violations observed on the first visit were corrected by the second visit. See Michigan Dept. of Health, Migrant Health Project, Annual Progress Report, Agricultural Labor Camp Licensing Program (Lansing, Michigan, 1966).

agriculture will not draw laborers from outside the agricultural labor market. In addition, within this market certain stoop labor tasks are so undesirable that even members of the agricultural labor force will not do them. It is instructive therefore, to examine the wage changes in non-pickle crops in Michigan following 1964. If the stoop labor hypothesis were true, there should be little spill-over of domestic workers from other crops to pickles, and thus only small wage adjustments in these crops as a result. If the hypothesis failed to hold, then more noticeable increases would be expected in the non-pickle crops.

Increases in the wages of non-pickle crops would be expected (1) if pickle workers were substitutable with workers in these other crops and then (2) if the harvest period of the crops overlapped with the pickle harvest. As for the first condition, if pickle work were substitutable with other crops, then the types of workers attracted to pickles would be those familiar with the more difficult agricultural tasks: reach-up type crops and particularly stoop-down types, such as tomatoes, asparagus and strawberries (see Chapter II).

The main crops overlapping with the period of labor demand for pickles can be seen on Figure 3 of Chapter II. The large cherry labor demand begins to decline as the pickle demand swells. Blueberries are picked

throughout the pickle harvest but this work is less demanding and uses many women and children. The tomato harvest expands as the pickle harvest falls off. In addition, a number of small labor-using crops have a peak demand during the pickle harvest. Of the major crops, one might expect tomatoes and potatoes to be more closely competitive for harvest labor with pickles because of location and similarity of work. Cherries might be competitive if the weather caused overlap in the harvest periods. As pickle companies sought domestic workers, on a small scale in 1965 and then all-out in 1966 and 1967, these crops should be affected more than others by increased wages and improved working conditions.

Any impacts upon crops not directly competing with pickles would be different. If pickle companies contracted domestic labor on a large scale for the period from August 1 through September 15, then more workers could be available for work in other crops prior to and following this period. In 1966 and 1967, the pickle companies guaranteed many laborers continuous work from June through the middle of September in order to obtain them for pickles. Thus the pickle companies contacted asparagus and strawberry growers to find work for contracted pickle laborers for the period prior to the pickle harvest. The impacts on these two crops might have been to retard wage increases. This also could be the case for crops

following pickles. However, if workers earn good money in crops through the end of August, there is an incentive to return to their home base in order to enroll children in school, or to go to crops located in warmer areas. Thus the impact on crops following pickles would be difficult to determine.

The analysis of wages will review first the overall wage adjustment for all Michigan crops, then consider the wages of individual crops in the state, and finally view adjustments in non-wage forms of remuneration. The data for all Michigan crops are reviewed first since they are considered the more reliable estimates.

Overall Wage Data

Table 8 and Figure 12 show wage data for agricultural workers in Michigan. The U.S. Department of Agriculture data are the average wage rates recorded for all hired workers in the state for the last week of both July and October. The estimates are gathered quarterly and only the quarters ending in July and October have been used to compile the annual averages, because these periods include larger numbers of seasonal workers. These wage figures probably overstate the wage levels of migrants but are considered quite reliable in indicating trends and changes in migrant wages (see Appendix II).

TABLE 8.--Estimated average hourly wage rates for agricultural workers in Michigan, 1950-1967.

Year	USDA*		FLS**	
	Average Wages	Rate of Change	Average Wages	Rate of Change
1950	$0.825			
1951	0.930	12.72%		
1952	0.975	4.85		
1953	1.010	3.59		
1954	1.005	-0.50		
1955	1.025	1.99		
1956	1.055	2.92		
1957	1.065	0.95		
1958	1.055	-0.94		
1959	1.070	1.42		
1960	1.070	0.00		
1961	1.090	1.87		
1962	1.105	1.38	$0.954	
1963	1.120	1.36	1.115	16.90%
1964	1.135	1.34	1.041	-6.64
1965	1.205	6.20	1.100	5.67
1966	1.320	9.54	1.322	20.18
1967	1.410	6.82	1.385	4.77

Source: *USDA, Statistical Reporting Service, Farm Labor.
**Michigan Farm Labor Service, Michigan Farm Labor Report, Post-season 1967, 34.

The Farm Labor Service estimates are for seasonally hired workers only. These figures are not as well controlled for error and, unfortunately, they do not stretch back as far as the USDA figures, making statistical measurement more difficult. The collection techniques as well as an evaluation of the reliability of both sets of data are discussed in Appendix II.

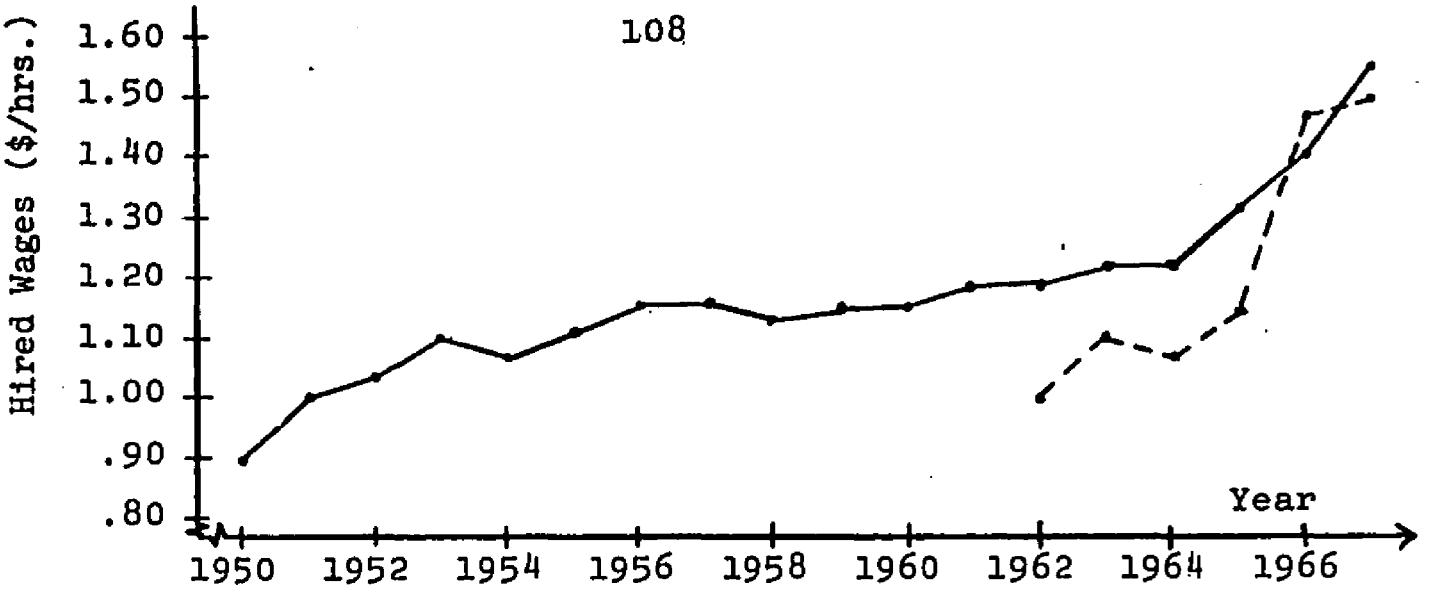

Fig. 12.--Estimated average hourly wage rates for agricultural workers in Michigan, 1950-1967.

The USDA figures show a sharp rise in wage rates following 1964 while the FLS figures start increasing in 1966. As has been indicated the pickle industry began recruiting on a large scale about half-way through the 1965 season. Thus any spill-over effects on other crops may not have occurred in 1965 as much as in 1966, when the pickle industry competed with these crops in the winter recruitment.

In order to test whether the rise in wages following the ending of bracero use was statistically significant, the slope coefficients of regression lines fitted to the data for the periods during and after bracero use were derived and compared.[1] The regression equation for the 1950-1963 period from Figure 12 is,

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[1]Actually the two periods chosen were 1950-1963 and 1964-1967. To help make statistical measurement more

$$w_1 = 0.9194 + 0.017t_1,$$

where w = wages and t = time. The regression equation for the 1964-1967 period is,

$$w_2 = -0.1895 + 0.094t_2.$$

In both equations the slope coefficients were significantly different from zero, for the earlier period at a degree of significance less than .0005 (less than .05 per cent of the correlation was due to chance), and for the later period at a significance level of .004. To test whether the two coefficients were different from each other the following t-test was used:[1]

$$t_{n-4} = \frac{b_2 - b_1}{\sqrt{\frac{1}{\sum_{i=1}^{k} t_i^2 - \frac{1}{k}(\sum_{i=1}^{k} t_i)^2} + \frac{1}{\sum_{i=n-k}^{n} t_i^2 - \frac{1}{n-k}(\sum_{i=n-k}^{n} t_i)^2}}}{\sqrt{\frac{\sum_{i=1}^{n} (w_1 - \hat{w}_1)^2}{n-4}}}$$

meaningful the last year of bracero use was included in the post-bracero period. Observation of the scatter of points on Figure 12 indicates that this should not confuse the results.

[1] The author is indebted to Alan Oaten, a Ph.D. candidate in statistics at Michigan State University, for helping derive this test. See also Bernard Ostle, Statistics in Research, 2d ed. (Ames: Iowa State University Press, 1963), Ch. 8. In constructing this test it has been assumed that the variances of the two distributions (for b_1 and b_2) are equal, the necessary step which allows for use of the t-test.

where: b_1 = slope coefficient of the 1950-1963 period

b_2 = slope coefficient of the 1964-1967 period

k = years from 1950 to 1963

n = years from 1950 to 1967

$\hat{w}_1$ = wage values on the regression line at each t value for each period.

The t-value obtained from using the test was 5.150, which at 14 degrees of freedom, is significant at the confidence level of less than .005; that is, the probability of the difference between b_2 and b_1 being a result of random chance is less than .05 per cent. Thus the visible break in the graph on Figure 12 can be deemed a statistically significant one and the inference drawn that wages in all Michigan crops rose significantly following the termination of bracero use.

A similar analysis was not applied to the Farm Labor Service data due to the limited number of observations as well as the poorer state of the estimates. Regardless, a noticeable increase appears evident following 1965. A large increase was also observed following 1965 with the USDA data. An explanation for the strong advance in 1966 will be given following the wage data on specific crops.

The indication gained from this finding is that the removal of braceros affected not only wages in pickles, but also wages in all Michigan crops, and affected these

wages significantly. This infers that stoop labor work in pickles did draw workers from other crops. This finding would not support the stoop labor hypothesis.

One further question seems obvious. Can the significant increase in wages strictly be tied to the termination in employment of braceros? The intuitive appeal of this conclusion is strong, since pickle growers in 1965 had to enter the general labor market for domestic migrants and bid for workers against employers of other crops. With the reduced supply of all workers, then the demanding employers would push wage offers up.

In order to test the determinants of the wage change, the various factors affecting wages were isolated and regressed against wages for the period 1950-1967. The different factors and the regression equation are reported in Appendix III below. Unfortunately, there was a great deal of error in estimating the independent variables, and then intercorrelation within the multiple regression, such that statistical results were not helpful.

Specific Crop Wage Data

Table 9 shows wage rate data for selected crops from 1963 to 1967. On that table data are derived from Farm Labor Service wage rate reports issued throughout each season.[1] The top half of the table gives estimates of

[1]On the 15th and 30th of each month every regional office of the FLS compiles estimates of employment and

TABLE 9.--Estimated average hourly wage rates in selected crops of Michigan Agriculture, 1963-1967.

Crop	1963	1964	1965	1966	1967
FLS estimates of average hourly earnings[1]					
asparagus	$0.90	$0.92*	$1.32*	$1.28*	$ --
strawberries	0.76*	0.78	1.00*	0.96	--
cherries	0.72*	1.05*	0.96*	1.15	1.35*
blueberries	0.55	0.55*	0.57*	0.65*	--
pickles	0.86	0.91	1.57	2.05	--
tomatoes	0.93*	0.94*	1.20*	1.60*	1.71
apples	1.35*	1.40*	1.57*	1.70*	--
FLS piece rate estimates converted to average hourly earning equivalents[2]					
asparague	$0.89	$0.95	$ --	$ --	$1.27
strawberries	0.86	0.86	0.97	0.99	1.20
cherries[a]	1.07	0.99	0.99	1.40	1.57
blueberries	0.49	0.49	0.55	0.62	0.66
pickles[b]	--	--	1.28	1.28	1.28
tomatoes[c]	1.17	1.17	1.17	1.26	1.30
apples[d]	1.80	1.98	2.07	2.25	2.70

*Indicates judgment used, combining several regional reports and giving greater weight to the region of largest production.

[a]Piece rates are those reported for the Traverse Bay area only.

[b]Per cent of crop value used in 1963 and 1964; $1.00 per bushel used in later years.

[c]Piece rates for the large Berrien area were not reported.

[d]These rates are undoubtedly for tree pickers only, not ground pickers.

Source: [1]FLS, ES-232 reports. Very few of these reports were made in 1967 and thus only limited crops are reported.

[2]FLS, ES-223 reports converted by use of worker productivity studies published as Research Reports by the Rural Manpower Center, Michigan State University (East Lansing, Michigan).

average hourly earnings made by the FLS and taken from ES-232 reports, studies conducted sporadically during the migrant season by the FLS. The bottom half of the table gives estimates based on piece rates reported regularly by the FLS on form ES-223, and converted to average hourly rates by use of the worker productivity studies published by the Rural Manpower Center at Michigan State University.[1] In both cases the FLS reported wage rates for several regions within the state, and judgment was used in choosing rates to be used for the state average.

In addition to these figures the questionnaire used in the research provided estimates of wage rates in pickles. These results are presented in Table 10. The questionnaire asked for wage rates by payment method used: hourly, piece rate, per cent of crop value (see questionnaire #14 in Appendix II). The average piece rates for each year are reported and, in parentheses, converted to average hourly equivalents by the same method as used for

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wage rates being paid in that region, and these are placed on form ES-223, which is sent to the state office. Throughout the season the Washington office of the Farm Labor Service can request special estimations of average hourly earnings for selected regions and/or crops--form ES-232.

[1]These studies reported average worker productivity rates for each productivity decile of workers within two general worker classes: (1) all workers over 18 years old, except in a few crops in which youth were included; (2) productive adult workers. The conversion factor used for obtaining average hourly earnings was average (median) productivity of the first class (all workers over 18)--the productivity of all workers at the 50th percentile.

TABLE 10.--Estimated wage rates for pickle harvest work in Michigan, 1964-1967, taken from grower questionnaires.

Payment System	1964	1965	1966	1967
Paid hourly rate	$1.11	$1.17	$1.23	$1.26
# of responses/ std. dev.	36/.06	23/.09	25/.11	29/.14
Paid piece rate (per bushel)	.93(1.32)	.80(1.14)	.96(1.21)	.91(1.29)
# of responses/ std. dev.	3/.27	5/.27	10/.25	14/.20
Paid % of crop value	50.4%	51.0%	50.8%	51.2%
# of responses/ std. dev.	19/5.28	13/6.92	17/6.00	20/5.91

the bottom set of figures on Table 9. Beneath each wage figure reported the number of questionnaire responses for that year and the standard deviation from the mean wage rate for all responses are given.

The most frequent form of wage rate reported on the questionnaire was wages paid per hour. These data are quite similar to figures recorded by the Farm Labor Service (not reported on Table 9)[1] of wages paid per

[1]The hourly rates recorded by the FLS were collected for different regions around the state and for the workers within these regions paid on an hourly basis. The FLS did not report an average of these figures for the state, which explains why they have not been reported here. By comparing the figures as reported by the several regions, the rates appear very similar to the hourly rates obtained from the questionnaire.

hour. Piece rate payment methods, as recorded on the questionnaire, are probably faulty representations in 1964 and 1965, due to the limited number of observations. The questionnaire piece rates for 1966 and 1967 may not vary much from the average of wages actually paid during these seasons, though the standard deviations are large. This conclusion is based on field research and the fact that piece rates as reported by the FLS were quite similar. The average hourly equivalents on Table 10 are lower than those reported on the top half of Table 9. This disparity is due to the application of different worker productivity figures to similar piece rates. It appears the FLS used higher average worker productivity figures to obtain their estimates than was found to exist by the Rural Manpower Center at Michigan State University.

For reasons given in Appendix II the figures on Table 9 are of doubtful precise accuracy, probably being overstated--especially those on the top half of the table. Regardless, they are the only figures available and will be analyzed for whatever value they offer. In 1965 the crops experiencing the largest wage rate increases were pickles, tomatoes, asparagus, and strawberries on the top half of Table 9, and strawberries and blueberries on the bottom half. According to the ES-232 estimates made by the FLS, pickle wages rose 73 per cent from 1964 to 1965. This compares with a 6.2 per cent increase in the May-

October average for all hired workers as reported by the U.S. Department of Agriculture, and a 5.67 per cent increase for all seasonal workers as reported by the Farm Labor Service (see Table 8).

If pickle work were substitutable with other crops, tomatoes should be affected more severely. Tomato wages increased fairly substantially between 1964 and 1965, though the ES-223 reports did not show this until 1966. It is noted also that wages in asparagus and strawberries also increased perceptibly following 1964. Tying these increases to the termination of the bracero program is difficult. As noted below, during the 1966 and 1967 seasons the pickle industry supplied workers to these crops, which would tend to weaken wage advances. In 1965 however, this practice had not developed, and it is doubtful if pickle companies were seriously depleting the ranks of strawberry and asparagus workers during the spring of 1965. Nor, as reference to Table 7 above indicates, was weather an important factor in explaining the increases in these two crops.

Between 1965 and 1966, pickle wages rose 30.6 per cent, while wages of all hired workers as reported by the USDA rose 9.5 per cent, and wages of seasonal workers rose 20.2 per cent as reported by the FLS. Thus it appears that if any "spill-over" effect resulted from a reduced labor supply in pickles, it came in 1966 rather

than in 1965. Supporting this is a substantial increase in tomato wages between 1965 and 1966, greater than the increase for the previous year. Blueberry wages also increased at a more rapid pace between 1965 and 1966 than in the year earlier.

Supporting expectations, wage rates in both asparagus and strawberries weakened between 1965 and 1966, since the pickle companies were helping supply these crops with additional workers. Wages in the cherry crop through these years were probably influenced more by the weather and other factors than by competing pickle companies.

In 1967, it appears that the rate of increase in wages in most crops slackened from the two previous years; apples and strawberries may be exceptions. The USDA rate for hired workers advanced 6.8 per cent and FLS figure for all seasonal workers advanced 4.8 per cent, both less than for the previous year. Thus by 1967 the adjustment of the labor market to the reduction in the supply of braceros may have been completed. Regional directors of the FLS reported that a noticeable change was evident in 1967 over 1966. Whereas in the previous year few if any "free-wheelers" were around, in 1967 a number of free-wheeling groups came to the state.[1]

[1]A number of factors could have led to this increase in available supplies of labor in 1967 over 1966:
(1) Workers coming for cherries found little work due to the reduced yield and were forced into other crops.
(2) Pickle workers in 1966 returned to the supply states and spread the word that good money could be earned

From examining wage rate data on specific crops following 1964, the same inference can be drawn as was drawn above for all crops: it appears the scarcity of workers in pickles affected other crops in a pattern consistent with expectations, and in such a way as to question the existence of the stoop labor hypothesis during these years.

Impacts on Non-Wage Provisions

Field research suggested that growers often improve non-wage provisions of employment before they do wages, not really viewing these as increased costs. Thus, when the supply of labor became scarce mid-way through the 1965 migrant season, and especially between the 1965 and 1966 seasons when the pickle industry openly competed with other crops for domestic labor, one might expect improvements in non-wage provisions of employment commensurate with and perhaps preceding wage rate increases.

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in Michigan pickles. This brought more workers to the state, which, combined with poor yields and disease damage in pickles in the state, tended to weaken wages for pickles and other crops.

(3) The federal minimum wage in agriculture was higher than market-clearing wage rates in several southern states and this forced workers out of employment in those states into Michigan and other demand states.

In reference to this last point, Table 6 in Chapter II will show that the percentage of interstate migrants in Michigan from Florida increased in 1967, while the percentage from Texas decreased. Examination of the USDA composite wage rate for all agricultural workers in these two states shows that Florida wages were just under the $1.00 per hour minimum through October of 1967, while Texas wages fluxuated around $1.00 per hour.

Like wage rates, non-wage provisions would be expected to increase more for all crops in 1966 than 1965, and then perhaps to slack off in 1967, since the supply of workers was not quite as scarce. And like wage rates, these other allocators would be expected to advance first in crops competitive with pickles for domestic labor and then follow in other crops.

The types of non-wage allocators have been set forth in Chapter II and discussed in the context of different market situations in Chapter III. The main ones other than social security are housing and transportation and loan money. In addition, and depending upon the scarceness of labor supply, other non-wage provisions are added: continuity of the work pattern; number of family members employed; field conditions; extra services.

Data for All Crops

Quantitative data are not available for most of the types of non-wage remuneration. Therefore, for these provisions subjective observations must be offered. As noted above, housing generally improved during the period under examination. Undoubtedly, a great amount of this was due to the 1965 Michigan law enforcing minimum housing standards. Transportation and loan money was offered far more frequently by the pickle industry following 1964, primarily because loans were needed in the contracting of domestics. Field reports told of employers giving

transportation money for the workers' return trip to assure they would be available for the following season. In addition, in 1966 and 1967, employers made several trips to the supply states to both recruit and hold workers. After the initial recruitment trip, many employers visited workers a second and third time to "firm up" commitments, and offer more loan money. It seems clear that the amount of these non-wage provisions increased following 1964.

Because the labor supply was relatively scarce during the years under examination several other non-wage provisions were offered. Like the above provisions though, little quantitative data are available. From conversations with growers and industry personnel, it was evident that such provisions as field conditions, extra services, and continuity of the work pattern were substantially increased.

Several pickle employers noted that workers were taxied between fields and farms much quicker than before. One pickle grower noted that he allowed his crew to take several days off to visit friends in other parts of the state. Under conditions of abundant labor supplies such a practice would be discouraged, if not disallowed.

Probably the most frequent "additional" provision however was the continuity of the work pattern. In years of abundant labor supplies employers are not under

pressure to assure workers a continued work pattern. However if the supply were scarce then employers would be under more pressure to offer complete work patterns in order to retain migrant crews. Numerous employers testifyed to the fact that they made calls during the season to other growers seeking work for their crews. And on their own farms these employers would "find" work, in order to discourage any unrest from poor employment opportunities. The practice of arranging jobs before the beginning of pickle work in such crops as asparagus and strawberries also supports this observation.

The only good quantitative data available pertain to the hours of work by all hired workers in the state. An examination of these data might give some indication of how concerned employers were to keep workers actively employed, and thus some indication of this non-wage provision of employment.

The U.S. Department of Agriculture began reporting monthly information on hours of work per week for hired workers in 1965, and these data are graphed for the months of May to October on the right-hand side of Figure 13. Data were reported three times yearly (June, September, December) for hours of work per day for hired workers until the end of 1961. Unfortunately no published series picked up the break between 1961 and 1965. The

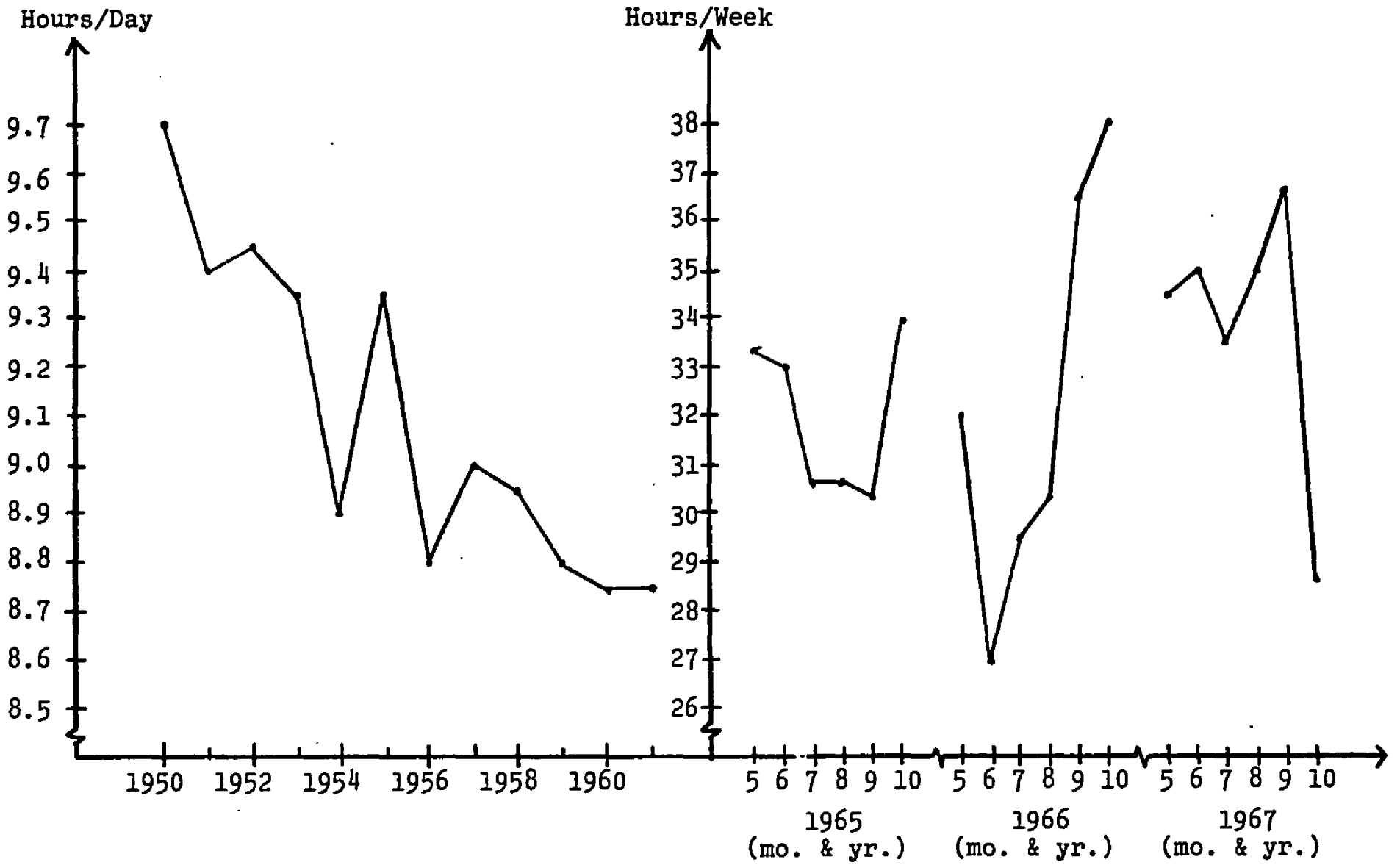

Fig. 13.--Hours of work per day and per week for hired workers in Michigan, 1950-61 and 1965-67.

figures for the annual June and September average of the pre-1962 series are graphed on the left-hand side of Figure 13.

In a market where labor supplies are scarce the data should show an upward tendency. It is interesting to note the downward trend for the hours worked per day data from 1950 to 1961. This period, as reference to Table 1 in Chapter I above will show, was marked by continually increasing numbers of Mexican nationals.[1] For the more recent period these data indicate a mixed trend. In 1965 there is a rise in hours worked per week in the late season. A generally upward trend holds throughout 1966. In 1967 the trend is again mixed, moving up except for the last month recorded.

The analysis of these data would support the findings drawn from the study of wage rate data: that wages moved up more significantly in 1966 than 1965, and there was probably a weakening in the rate of increase for 1967. The hours of work per week data show an upward trend in 1966 and a mixed trend in 1967.

Beyond these more specific non-wage provisions, subjective information obtained in the field research

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[1]Simple correlation analysis between hours of work per day and various measures of bracero employment for the period 1950 to 1964, yielded significant F values at the .001 level of confidence. In all cases the correlations were negative.

supports the general observation that 1966 was a year of scarcer labor supply than either 1965 or 1967.

Regional directors of the Farm Labor Service reported that in 1967, growers could cull their work crews, ridding them of unproductive workers. In 1966, many growers had to "pamper" workers to keep them from leaving for better opportunities elsewhere. One regional director noted that 1967 was the first year he could recall in which there were no reports of shortages from the various in-state regions during the migrant season. Such a situation is understandable. With an effective minimum wage for the first time, and an effective minimum housing standard, two major allocators in this labor market had floors. Thus an abundant labor supply could not function to push wages down, and at the minimum rates growers could get all the workers they desired; the minimum then would be at or above the market-clearing wage package (see Chapter III).

Questionnaire Data

On the questionnaire mailed to pickle growers a set of four questions were asked to discern changes in non-wage forms of remuneration (see questionnaire #12, Appendix II):

> 12a. Within the last three years have you had to give workers a greater guarantee of constant work before they will work for you?

12b. Once workers are with you, have you had to provide more work (on your farm or others) to make them stay with you?

12c. Has there been a higher turnover of workers on your farm within the last three years?

12d. Have you had to improve workers housing better than state regulations require to get enough workers within the last three years?

A "yes" answer for any question would suggest that non-wage forms of remuneration had improved following 1964. Number 12c, the question on turn-over, could show a very abundant or very scarce supply situation; with many workers available growers may release and hire workers more often, and with a scarce labor supply workers may quit more often for better opportunities elsewhere. In responding to these questions growers answered "yes," "no," or "no answer." The "no answer" response was not considered in the data reported in Table 11.

These responses are subjective and must be taken as indications only. The ordinal rank probably is more important than the cardinal values. Considering the ordinal rank, pickle growers viewed an increased turnover as the major reaction following 1964. In 1965, this may have been due to the poor quality of workers employed. This observation is supported by the relatively large number of comments written about this question stressing the poor quality of workers subsequent to braceros. As to what actions growers had to take, slightly more

TABLE 11.--The number of "yes" responses to non-wage payment methods on the pickle grower questionnaire.

Question No.	Total Responses	"Yes" Responses	Per Cent of "Yes"
12a	102	37	36%
12b	102	34	33
12c	102	49	48
12d	91	23	25

indicated they had to give assurance of continued work before workers arrived than to make sure they had continued work after they arrived. This finding might suggest that workers have had more bargaining power in negotiating employment but lose some of this power once they arrive. Housing does not appear to be very important as an inducement when there is a scarce supply of labor.

Some interesting differences from the state percentages result when the data are broken down regionally within the state. Table 12 presents data for two regions within the state, the southwestern corner of the state and the Bay area at the hand-side of the thumb, both large pickle growing areas.[1] The southwestern region uses a

[1]These regional data were compiled by counties. The counties grouped into the southwestern area were: Berrien, Cass, St. Joseph, Van Buren, Allegan, and Ottawa. The counties grouped into the Bay area were: Arenac, Gladwin, Midland, Bay, and Saginaw.

larger number of migrants in all crops than any other region within the state, and there are several other crops in this region being harvested concurrently with pickles. The Bay area uses migrants early for sugar beets, but pickles is the major employer in the second half of the summer.

TABLE 12.--Regional responses to questions on non-wage payment methods.

Question No.	Total Responses Per Region (Southwestern/Bay)	"Yes" Responses (Southwestern/Bay)	Per Cent of "Yes" (Southwestern/Bay)
12a	30/27	15/9	50%/33%
12b	20/26	17/5	57/19
12c	31/26	15/13	48/50
12d	30/21	9/7	30/33

The responses to the last two questions are roughly the same for both regions, which could substantiate the inference that housing seems to be less important to workers uniformly. The differences lie in responses to the first two questions. More growers in the southwestern region had to promise continued work and supply continued work than growers in the Bay region. One would expect this in an area like southwestern Michigan, where a number of crop alternatives confronted workers. In the Bay area

alone, growers have had to promise more continued work than they have had to supply. This is seen in the 33 per cent "yes" response to question 12a, which asked whether more work had to be promised following 1964, and the 19 per cent "yes" response to question 12b, which asked whether more work had to be provided once workers were on the farm. With fewer work alternatives for migrants in that region the employers did not have to provide as much work as promised.

A second group of questions from the questionnaire asked what "additional benefits" other than wage rates, have growers supplied workers in each of the last four years, 1964-1967 (see questionnaire #15 in Appendix II). The alternatives listed were: housing, transportation money to Michigan, transportation money from Michigan, loans (credit), insurance, other (explain). The responses to this question were unsatisfactory for purposes of evaluation. Many growers received their labor from the pickle companies and either noted that "the company takes care of this," or left the question blank. Of those checking off benefits, loans seemed to be checked more often in years after 1964. This would be expected since loans were not necessary prior to 1965 in recruiting braceros.

Conclusion

The wage data for all crops showed a significant increase following 1964, and the wage data for specific crops tended to support this finding. The data on non-wage forms of remuneration for all crops are evel less conclusive, but appear to support the observations drawn above.

What these observations appear to indicate is that braceros constituted an important numerical factor in the seasonal labor market, and their removal created a substantial gap. In an effort to replace them pickle employers drew workers from other crops, which subsequently were forced to increase wages to domestic workers. In reference to Figure 11 above, this suggests that the relevant supply curve with braceros was S'S'. The question remains however, what was the specific supply response of the domestic migrant labor force in Michigan pickles following 1964?

Supply Response

The purpose of this section is (1) to perceive the supply response of domestic migrants to increased wages in Michigan pickles following 1964, and (2) determine whether this response (or lack thereof) will support the stoop labor hypothesis. In order to view the employment response, the recruitment experience of the pickle industry following 1964 is briefly reviewed.

In the winter of 1965, there was considerable doubt about the possibile availability of braceros. At least two large pickle employers sought domestic migrants from Texas early in the season, and reported that they suffered no labor problems during the year. Most employers however waited until the late spring and early summer before trying to recruit workers, after most domestics from the large labor pool of the southern supply states had made commitments.

When it became clear that the Secretary of Labor would not authorize braceros under PL-414 as easily as had been done before, the employers and the Farm Labor Service sought domestic workers willing to do pickle work from a number of different sources. Many of the workers contacted were not customarily a part of the agricultural labor force.[1] One such effort was the A-team program, designed to enlist high school athletes (A) in both a financial and conditioning opportunity. The teams used rarely were composed of athletes however and generally were poor youth from the cities.

It seems safe to conclude that most of the special recruitment efforts during 1965 fell far short of their

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[1]For a review of some of these efforts see Charles A. Hill, "The Hills Echoed the Call . . . Mobile Recruitment of Agricultural Workers," Employment Service Review, 3 (January, 1966), 5.

goals.[1] Many of the workers recruited lasted only a short time and then either quit or were released. In general, the productivity of the workers obtained was far inferior to the braceros. From information supplied on the questionnaire sent to pickle growers, it is possible to construct worker productivity estimates for each year, 1964 to 1967. Questionnaire #17 asked for the number of workers employed in an average week during harvest for each year. By finding the average number of employees per farm for each year, and then dividing this figure into the average harvested acreage per farm (questionnaire #8), the number of acres per worker can be approximated. This estimate provided the following figures: 1964--1.34 acres/worker; 1965--0.93; 1966--1.06;

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[1]Other reasons contributed to the lack of recruitment success experienced by pickle companies in 1965:

a. Failing to bid for the more professional Mexican-Americans early in the winter, the pickle companies were forced to bid for southern whites and blacks, many of whom had little stoop labor experience and lacked the economic and sociological incentive to migrate to other parts of the country.

b. The pickle industry had developed a mentality which provided a negative psychological set to effective recruitment. On the one hand, the industry had not had to fight the rigors of recruiting for over a decade. The companies were products of a lax administrative control over PL-78, where almost unlimited numbers of braceros could be obtained at a given constant cost, and they grew soft under such subsidy. On the other hand, the pickle companies had become accustomed to treating workers in a way that made recruitment of domestics difficult; braceros were captive laborers and did not require special handling.

c. The housing offered by the companies often was barracks-style and not suitable to many domestic workers, especially Mexican-American families.

d. Many of the workers contacted were quite reluctant to accept pickle work, due to its low wage status in the past.

1967--1.15. These findings are supported by numerous comments written on the questionnaire and made during interviews. The workers obtained in 1965 were far inferior to braceros in productivity. These findings also suggest that the domestic workers recruited in 1966 and 1967 were inferior to braceros as well, which might be explained by the presence of women and children in the work crews of the Mexican-Americans used in these two years.

Due to the poor recruitment success in the early summer of 1965, pickle companies were forced to seek other workers once the harvest period began. In these efforts they sought workers from non-pickle crops in Michigan and surrounding states, thus tapping the regular migrant labor market. As the pickle harvest began, Crop Area Supervisors of the Farm Labor Service in western Michigan reported pickle recruiters "on the streets and in the orchards" trying to obtain workers. A number of migrants were obtained in this way, however worker supplies were still inadequate to gather the entire harvest. Some fields simply went unharvested and other fields were harvested less frequently than normal, yielding larger fruit and consequent lower returns.

In 1966 and 1967, pickle recruiters traveled south during the winter recruitment period and contracted with

domestic workers, primarily Mexican-Americans, to work the pickle fields. Unlike earlier years, when employers had to "go through the motions" in order to qualify for braceros, in these two years the recruiters carried out "positive" recruitment. They offered the migrants higher wages and improved working conditions, and most importantly, a guarantee of continued work through most of the summer season. As mentioned above, to carry through on these promises the pickle companies arranged work for the migrants early in the season in asparagus and strawberries on the western side of the state, and also found odd jobs later when pickle picking slowed. As a result of these efforts most growers in 1966 and 1967 received adequate supplies of domestics.

It should be noted that many of the workers approached in 1966 and 1967 were the same domestic migrants who had come to Michigan in earlier years to work in crops other than pickles. When offered higher wages and a more continuous work pattern, these migrants accepted pickle work. Thus these workers were completely substitutable with workers in other Michigan crops.

Market Analysis

The situation in the pickle labor market of Michigan can be seen in Figure 14, where DD was the demand curve for harvest labor in 1964, and S'S' the relevant supply curve with the presence of braceros.

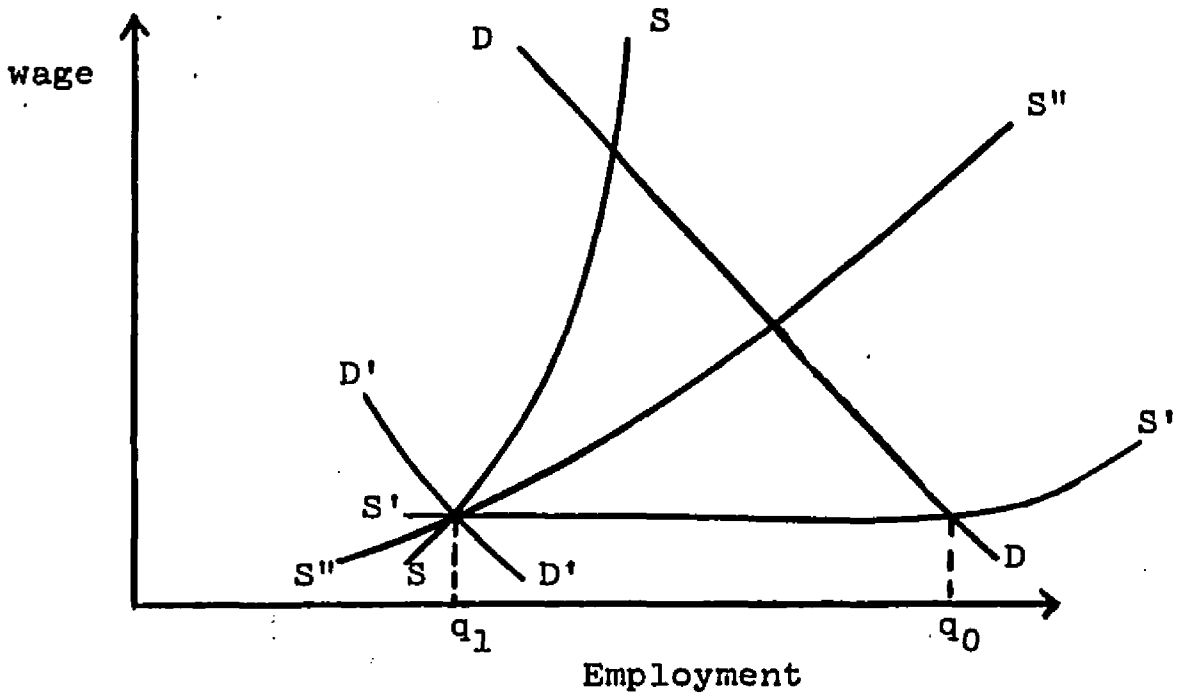

Fig. 14.--Demand for and supply of pickle workers in the seasonal labor market of Michigan agriculture, 1964.

In 1964, q_0 was 16,300 workers and q_1 was 3,500 workers, the peak number of all workers and domestics respectively, as reported by the Farm Labor Service on August 15th. It is possible to assume the demand schedule for domestics in 1964 was actually D'D'. Thus there would be a large increase in this demand curve in 1965 and years following, perhaps approaching DD. With the removal of the braceros in 1964, then S'S' no longer was the supply curve facing the pickle industry. If the stoop labor hypothesis were true, SS would be the relevant supply curve. If the stoop labor hypothesis were not true then the relevant supply would be some curve S"S", more elastic than SS.

If there were no change in the demand and supply conditions in this market between 1964 and 1965, then the DD curve would remain the demand curve and either SS or S"S" would be the supply curve. The more likely case however, is that both demand and supply conditions changed between the two years. In the case of demand, the DD curve assumes a given number of employers with a given scale of plant, as well as given expectations concerning such things as worker productivity. If braceros were not expected in 1965, or if wages were expected to be higher, or if worker productivity were expected to be low, then no doubt DD would shift to the left. This would result because some employers would drop out of the market and others would change their scale of plant. Supporting this tendency would be the adaptation of new technology by employers. The more likely position of the demand curve in 1965 therefore, would be some curve D_1D_1 on Figure 15, to the left of D_0D_0.

As for the supply curve, there is similar doubt that this schedule would have remained unchanged. During the period between 1964 and 1965, and within the 1965 season, there were factors tending to push SS (or S"S") in both directions. On the one hand, during the mid-1960's there were steady improvements in the general economy, and thus likely increasing opportunity

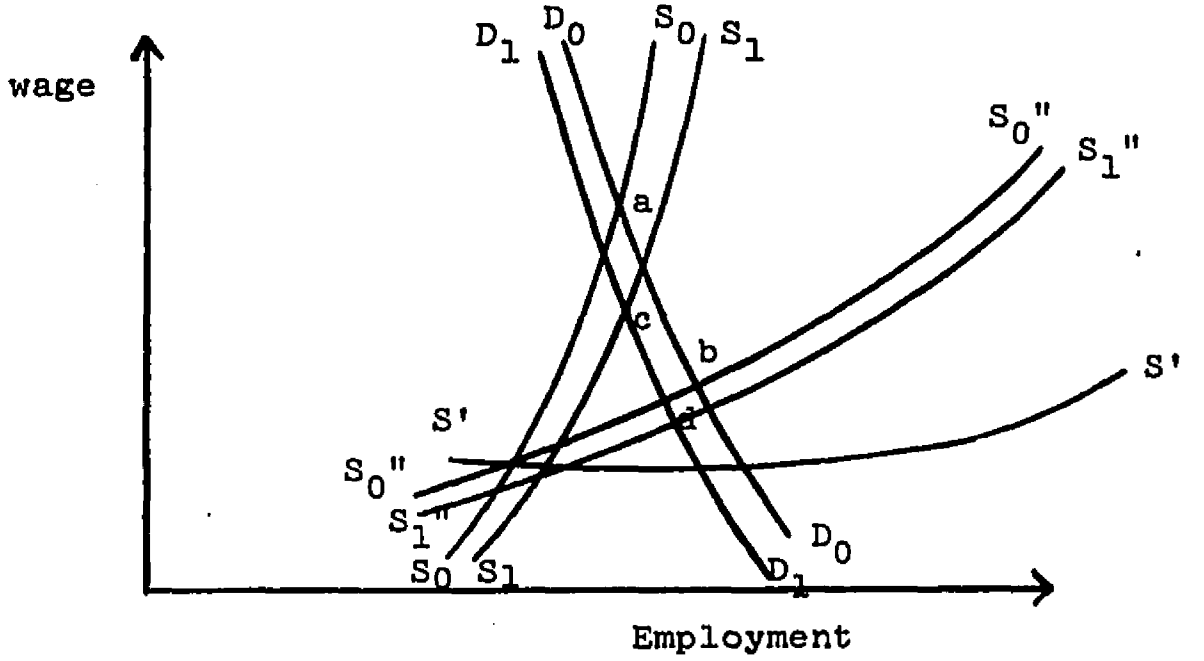

Fig. 15.--Demand for and supply of pickle workers in 1965, considering possible changes in demand and supply.

costs to farm employment, whether from non-farm employment opportunities or non-employment opportunities such as retraining. The effect of rising non-farm opportunity costs would push the relevant supply curve leftward.

On the other hand, several forces may have been operating to push the relevant supply curve to the right. In recruitment during 1965, employers tapped segments of the general labor force previously not approached for farm work, for example the youth in the A-teams and several southern regions. In addition, some domestic migrants may have stayed away from pickles before 1965 because it was a "bracero crop," and in 1965 entered

this segment of the agricultural labor market.[1] Another force pushing the supply curve to the right would result from decreasing opportunity costs facing members of the agricultural labor force, brought on by technology advances in crops other than pickles; if, for example, more cherry trees were shaken in 1965 over 1964, then workers normally doing cherry work would be freed to do pickle work.

The net effect of these contradicting forces would be difficult to gauge. For 1965, it is probably doubtful that decreasing opportunity costs from an increasing technology were greater than increasing opportunity costs from non-farm employment. However, the fact that previously untapped segments of the general labor force were approached might have served to push the relevant supply curve to the right, either to S_1S_1 or $S_1''S_1''$, on Figure 15. Consequently, the equilibrium points between demand and supply in 1965 were likely to be either points c or d, rather than points a or b, on Figure 15.

Elasticity Measurement: 1964-1965

What were the relevant magnitudes in 1964 and 1965? Table 13 presents wage and employment estimates

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[1]See Mamer, "The Use of Foreign Labor," 1207-1208, and the discussion in Chapter III above, under "Bracero Program."

TABLE 13.--Estimated peak employment of domestic pickle workers in Michigan and estimated average hourly earnings of all pickle workers in Michigan, 1964-1967.

Measure	1964	1965	1966	1967
Estimated peak domestic employment	3,466	11,600	16,500	18,533
% change/year		235%	43%	12%
Estimated average hourly earnings	$0.907	$1.57	$2.05	--
% change/year		73%	31%	--

Source: Michigan Farm Labor Service, Michigan Farm Labor Report: Post Season (Detroit, Michigan).

for the pickle labor market of Michigan between 1964 and 1967. These figures are prepared by the Farm Labor Service of Michigan as explained in Appendix II. The wage data are the same as those reported on the top half of Table 9 above, based upon ES-232 reports. As noted there, these figures may be overstated for the years following 1964. The employment figures are estimated peak employment during the season in pickles, as reported in Table 5 above.

Unfortunately, the worst data available are employment data. These data are not controlled for error, have a tendency to be overstated, and are subject to political manipulation. In 1965 especially, Crop Area Supervisors may have been inclined to inflate estimates in order to make their recruitment efforts appear successful. A

special problem in 1965 was the decline in productivity. Undoubtedly the figure for employment in 1965 was the number of workers in the fields: a body count. But as suggested, the productivity of the workers was far below that of the workers in 1964.

Recognizing the difficulties it is still possible to apply a crude elasticity measure to these figures. Elasticity measures the change in quantity supplied resulting from a wage change. There is a clear increase in wages to pickle workers between 1964 and 1965. An ideal measure however, should hold the supply curve constant in viewing the quantity effects of the wage increase. As suggested above, the relevant supply curve did change, perhaps shifting out.

The appropriate method of estimating elasticity would be an arc measurement rather than a point measurement, because of the large increase in wages. The measure is as follows, with the appropriate magnitudes from Table 13:

$$\frac{q_2-q_1}{q_2+q_1} \quad \frac{w_2-w_1}{w_2+w_1} = \frac{11,600 - 3,466}{11,600 + 3,466} \quad \frac{1.57 - 0.91}{1.57 + 0.91} = 2.03.$$

This is an elastic supply response to the higher wage offers. If the wage figure for 1965 was overstated, this would make the measurement even more elastic. If the employment estimate was overstated, this would make

the elasticity measurement lower, or more inelastic. It is possible to control partially for the decline in worker productivity in 1965. The estimates of productivity reported above from the questionnaire were 1.34 acres per man in 1964, and 0.93 in 1965; the 1965 figure is 69 per cent of the 1964 figure. Therefore, to control for productivity the 1965 employment estimate of the FLS can be reduced by this amount: 0.69(11,600) = 8,000 workers of equivalent productivity in 1965. The new elasticity measurement then yeilds:

$$\frac{8{,}000 - 3{,}466}{8{,}000 + 3{,}466} \quad \frac{1.57 - 0.91}{1.57 + 0.91} = 1.49.$$

Again this is an elastic response. There is no way possible to control for the overstatement in employment, but any overstatement would be off-set somewhat by an overstatement of the wage estimate.

How should this elasticity measurement be interpreted? What it purports to show is the slope of the supply curve of domestic labor to Michigan pickles. As noted, to ideally measure the slope there should be no shift in the supply curve of domestics between 1964 and 1965, the period from which the data are drawn. It is possible however that the supply curve may have been shifting out, like S_1, S_2, or S_3 on Figure 16, and the measurement perceived a composite supply curve S_4.

Resolving this possibility is important, if the elasticity measurement is to be used to evaluate the stoop labor hypothesis.

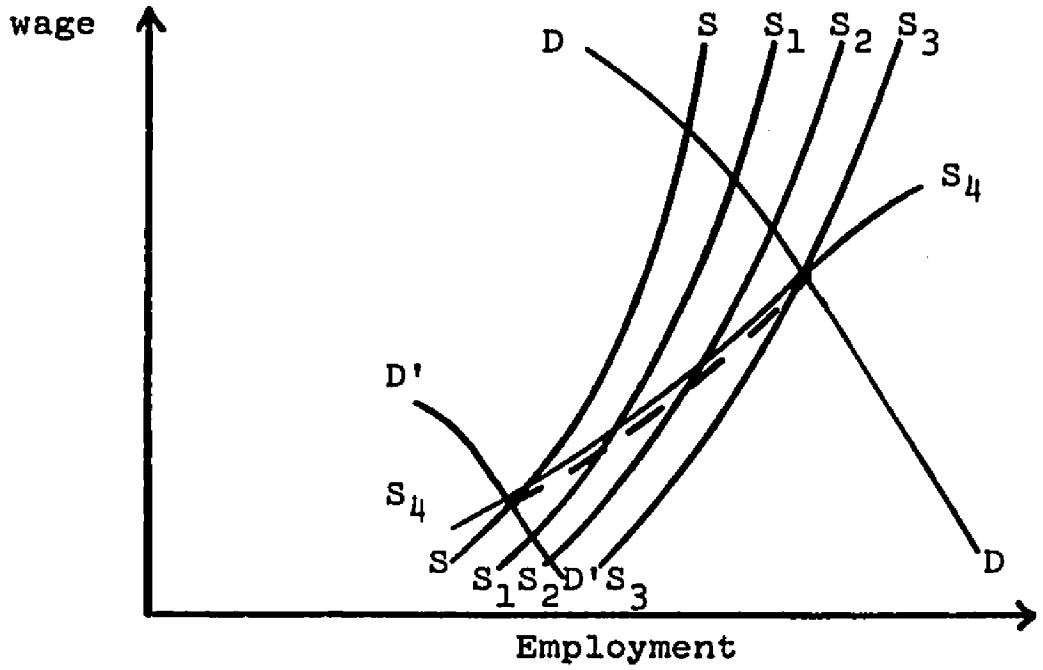

Fig. 16.--Demand for and supply of seasonal workers in Michigan pickles for 1965, considering supply curve shifts.

Gallardo and Fisher, both quoted above in Chapter III to support the stoop labor hypothesis, argued the existence of an inelastic (or perhaps backward-bending) supply curve <u>within</u> the context of an ongoing season--although, as noted, it would not be difficult to extend their argument to <u>between</u> two seasons. Therefore, to use the above elasticity measurement to reflect on the nature of the relevant supply curve, SS or S"S" on

Figure 14 above, one must discern whether what is being measured is between seasons or within an ongoing season.

Several pickle employers did go to Texas early in the 1965 season and recruit workers. Therefore, a portion of the employment figure for 1965 was of the "between seasons" category. However most of the workers employed in the 1965 pickle harvest were obtained within that ongoing season, after workers had made work commitments. It was late in the season, even after the start of the pickle harvest, when many employers sought domestic workers. Clearly, these workers were recruited within the season. To estimate the number of workers recruited this way is not possible, though it surely would be over half of the peak pickle employment for the year.

As mentioned above, in the review of the recruitment experience for these years, many of the workers approached in 1965 were not members of the agricultural labor force in previous years. This would tend to shift the relevant supply curve out to either S_2 or S_3 on Figure 16. However many of these workers quit or were released, and not that many may have been in the FLS estimates for August 15th as reported in Table 13.

To draw some definite conclusions from this attempt to measure the elasticity of the supply curve of domestic migrants to Michigan pickles, is difficult; there is a considerable identification problem. The

conclusions must remain tentative therefore, due to the many factors changing. However, it does seem fairly clear that the employment response to higher wages was not highly inelastic, or even negative, as suggested by the stoop labor hypothesis. Thus there is no clear support for the hypothesis and there appears to be a serious questioning of it, if the measurements obtained are at all realistic.

Elasticity Measurement: 1965-1966

It is possible to apply a similar elasticity measurement to the 1965-1966 period. Using the wage and employment estimates from Table 13, the arc measurement yields the following figures:

$$\frac{16{,}500 - 11{,}600}{16{,}500 + 11{,}600} \quad \frac{2.05 - 1.57}{2.05 + 1.57} = 1.08$$

Like the measurement made above for the 1964-1965 period, this one also is elastic.[1] It must be made clear that this period is one of between season recruitment, when pickle companies sought workers early before they had made other work commitments. Therefore, the possibility of the supply curve shifting in one direction or the other is obvious.

[1]If the worker productivity estimates from the questionnaire were included, the measurement found would be even more elastic. From 1965 to 1966, worker productivity increased, which means that the reported employment change between these years understated the actual change.

In 1966, several factors were operating which may have affected the supply curve. On the one hand, undoubtedly there were decreasing opportunity costs in other Michigan crops arising from increasing mechanization. Both blueberry bushes and cherry trees were being shaken. In addition, some strawberry acreage was being moved out of the state to the Southwest and Mexico. These forces would shift the supply curve of domestics willing to do pickle work to the right. At the same time the general economy was continuing to improve and thereby absorb workers from the ranks of agricultural labor; this force would push the supply curve back to the left.

In 1966 also, an additional factor may have been operating to push the relevant supply curve out to the right. In that year, in order to obtain domestics, the pickle companies arranged work in other crops prior to pickles, and generally gave migrants assurance of continued work if they would harvest pickles. It might be possible to interpret this as more than a simple wage increase: that workers really were being offered an entirely new type of inducement. If so, it would not be possible to compare the 1966 experience with earlier years, for the result of the "continued work pattern" offered would be numerous new workers willing to accept pickle employment: an obvious increase in the supply curve.

The pickle industry of Michigan argued that domestic migrants would not do the difficult pickle work, whether approached within an ongoing season or between seasons. Indeed, prior to 1965, the industry supposedly had not been able to recruit domestics at the start of each new season--thus, between seasons. Therefore, to find an elastic supply response to higher wages between 1965 and 1966 would seem to deny the validity of the industry's position. This conclusion would follow whether the increased offer was a simple wage rate or continual work pattern. The industry argued that domestics simply would not do the work; and the experience in seasons following 1965 showed that they would.

Fisher and Gallardo argued that the labor force of agriculture was a fairly established number of workers. If wages were increased there would not be many workers drawn from without, and those workers within the labor force would not offer much additional work--and some of them might even drop out of employment. The experience between the 1965 and 1966 seasons could be entirely compatible with this argument. If there were decreasing opportunity costs in 1966, arising from such forces as increasing mechanization in non-pickle crops, and thereby releasing workers from these crops, then this would swell the numbers of workers willing to do pickle work as the only alternative. This possibility is not inconsistent

with Fisher and Gallardo. But the findings for the years 1964 to 1967 also suggested that increased wage offers in Michigan pickles elicited a positive work response from members of the agricultural labor force. Many of the Mexican-American families used in 1965-1967 were more than willing to have the women and children work. This observation questions part of the conceptual framework of these earlier studies.

The wage figures for 1967 were not supplied by the Farm Labor Service and thus no elasticity measurement was made for that year. As Table 13 indicates, the number of domestics employed increased even beyond employment in 1966; and information from the questionnaire indicated these workers were slightly more productive than for the previous year. Observation of the wage rates paid, as reported on the pickle grower questionnaire (Table 10 above), suggests that there was very little increase in wages between 1966 and 1967. It is probable, therefore, that the "between season" supply response from 1966 to 1967 was again elastic.

Conclusions

As seen in the previous section, the significant wage increase for all crops in the state following 1964, suggested that workers in non-pickle crops were affected by the scarcity in pickles; that is, workers in non-pickle crops could be drawn into pickle work. The

information and analysis of this section suggested that strong support for the stoop labor hypothesis, on the basis of the supply response of domestics to higher wages, clearly was lacking. The inference from some crude elasticity measurements was that the supply curve of domestics to Michigan pickles may have been elastic. However, it is recognized that an identification problem existed in trying to isolate the relevant supply curve, and the conclusions are only indications.

CHAPTER V

ACREAGE AND CAPITAL ADJUSTMENTS

The higher wage offers for domestic migrants by the Michigan pickle industry in 1965 and 1966 appear to have elicited a relatively elastic labor supply response. This finding provided some evidence that the stoop labor hypothesis may not have held during these years, at least for the pickle industry. By examining the adjustments in acreage and capital substitution in this chapter, it may be possible to shed further light on the validity of the hypothesis.

It is possible to extend the stoop labor hypothesis beyond what it argued about the supply curve of domestic migrants. This corollary, as it were, suggests that the affected employers would have to pay quite high wages to attract domestics to stoop labor tasks. Financially they would not be able to do this, perhaps in the short run, but surely in the long run, and thus would either stop producing the crop or substitute capital for labor. If the stoop labor hypothesis were true, then the amount of these secondary adjustments would be greater than if the supply response of domestics were more elastic. By

examining these adjustments therefore, some further evidence may be obtained.

An examination of acreage changes and substitution of capital for labor inputs really gives evidence of the demand elasticity for labor.[1] Using these adjustments to reflect on the supply elasticity must be done in light of this fact. For example, by restricting the analysis to the pickle industry, and then perhaps finding only a small acreage adjustment, one could merely find that the demand curve for pickle labor was relatively inelastic. Table 14 shows the possible labor supply reactions to a wage increase in the form of a small matrix. As a result of the wage increase, if the supply curve were inelastic and the demand curve elastic, this would lead to the greatest decrease in domestic employment in the long run (or least elastic increase in the short run). If the demand curve were inelastic and the supply curve elastic this would yield the least severe decrease in the long run (or most elastic increase in the short run). The acreage and substitution effects would follow from these labor supply adjustments; a large employment decrease would accompany either large acreage decreases or large-scale capital substitution, and a small employment

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[1]Three major forces would seem to affect the elasticity of labor demand: (1) possibility of capital substitution; (2) transfer of the land to other uses, or possible transference of pickle acreage to other states; (3) elasticity of the product demand.

decrease would accompany smaller changes in acreage and capital substitution.

TABLE 14.--Matrix of possible employment responses to conditions of supply and demand elasticity and inelasticity, in Michigan pickles.

	elastic supply	inelastic supply
elastic demand	moderate decrease	greatest decrease
inelastic demand	least decrease	moderate decrease

It is possible moreover, that if the demand for pickle workers were relatively inelastic, the increased wages would affect crops with a more elastic demand more severely than pickles. If so, to examine only pickles would not turn up sufficient evidence. It must be recognized however, that proponents of the stoop labor hypothesis contended that the resulting adjustments upon acreage and capital substitution would be in the affected crop--namely pickles.[1] This was true because domestic

[1]"If termination [of bracero use] came after planting time, a most probable effect would be substantial abandonment of crops: if before, considerable transference of lands to less labor-intensive crops, or out of production, and ultimately, mechanization and/or diversification." Gallardo, "An Evaluation of U.S. Department of Labor Policy," 76.

migrants would not enter the stoop labor tasks, and thus these tasks were not substitutable with non-stoop labor tasks (say cherry picking).[1] Therefore, to examine acreage and capital substitution adjustments in pickles will help evaluate the hypothesis.

As the analysis below will show, there have been adjustments in acreage and capital substitution in pickles, involving an increased mechanization, and surprisingly, an increased acreage. At the same time, the industry appears to be preparing for a shift of acreage out of the state to selected southern states. In addition to these two questions a third one will be confronted, one raised in the course of the study: what was the effect of the termination of bracero use upon the retail price of pickles?

Acreage Changes

Acreage Changes Within Michigan

When the Congress terminated PL-78, and the Secretary of Labor refused to supply braceros under PL-414, several cries heard frequently from the pickle industry were, (1) acreage would be left unharvested in the field, and (2) there would be serious reductions in

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[1]It should be remembered that the analysis of wage changes in Chapter IV above suggested that a good amount of substitution of workers among crops did occur following 1964.

pickle acreage for the state. The first prediction was borne out partially, though not on the scale forecasted. There is no sound method of measuring the production lost. Of the 17,600 acres planted in 1965, the U.S. Department of Agriculture reported 16,300 were harvested, a drop not uncharacteristic of years when braceros were used. However the value of the harvested acreage would be a better indicator of the degree of damage, since reportedly the shortage in harvest labor affected the size of pickles harvested. The USDA also reported estimates of value, but their definitions changed in 1965 in a way making comparisons with earlier years virtually impossible. Numerous reports from the field in 1965 stated that the value of production was seriously affected.[1]

As for the second prediction, that pickle acreage would be reduced for the state, in 1965 there was a reduction in planted acreage from the previous year. As Secretary of Labor W. Willard Wirtz noted:

> There was a wider variety of changes in particular harvests in particular areas, most notably a large reduction in the pickling cucumber harvest in Michigan (although 1965 production for the nation as a whole was very near the 1964 figure).2

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[1]See the "Final Report of the Michigan Farm Labor Panel," in Secretary of Labor, Year of Transition: Seasonal Farm Labor, 1965.

[2]Ibid., 16.

No doubt the planted acreage for the state would have been less, were the many growers not expecting braceros in the spring of 1965. In 1966, the USDA reported a planted acreage of 20,900 acres, above the year earlier but below the previous decade's average for the state. In 1967 however, planted acreage increased to 29,400 acres, clearly consistent with levels existing prior to 1965. The fairly obvious conclusion is that the higher wage rates in years following 1964 did not lead to large acreage reductions, and this infers that the supply response of domestics was not so limited as to close out further production of pickles. A complete analysis of the higher acreage in 1967 however, must await the discussion of capital substitution, since a large part of the increased acreage was for mechanical harvesting.

Interstate Relocation of Acreage

Another prediction made by the pickle industry in 1965 was that removal of the braceros would cause processors to transfer production to states other than Michigan--notably the South--where labor costs were relatively less expensive. If the stoop labor hypothesis held and if the cost of transferring acreage were not too great then a fairly large transference might be expected. Table 15 and Figure 17 present two sets of data: the absolute production of pickles for Michigan

TABLE 15.--Total pickle production of the U.S., Michigan, and regional state blockings, and Michigan and regional state blockings as a percentage of U. S. production, 1950-67.

Year	U.S. Prod.	Michigan Prod.		Northern Prod.		Southern Prod.		Western Prod.	
		real	%	real	%	real	%	real	%
		(1000 bushels)							
1941-50	8.8	2.0	23.0%						
1951	11.5	2.9	25.0						
1952	13.8	3.5	26.5						
1953	13.8	3.4	24.5						
1954	12.7	3.1	24.5						
1955	13.0	3.6	27.9						
1956	13.5	3.8	28.2						
1957	15.4	4.8	31.3						
1958	14.9	4.1	27.9						
1959	14.1	4.6	32.6						
1960	14.5	4.3	29.4						
1961	17.1	5.7	31.9	9.5	53.5%	5.0	28.2%	3.3	18.3%
1962	17.1	5.0	29.3	8.0	47.2	6.1	35.7	2.9	17.1
1963	19.6	5.7	28.9	9.8	49.4	6.7	34.0	3.2	16.6
1964	17.8	4.8	27.2	8.5	47.5	6.3	35.3	3.1	17.2
1965	18.6	3.9	21.3	8.2	43.9	7.2	38.6	3.3	17.5
1966	22.2	5.1	23.0	10.5	47.2	7.8	35.2	3.9	17.6
1967	24.5	4.9	20.0	10.0	41.0	10.0	41.0	4.6	19.0

Source: U.S. Department of Agriculture, Statistical Reporting Service, Vegetables--Processing.

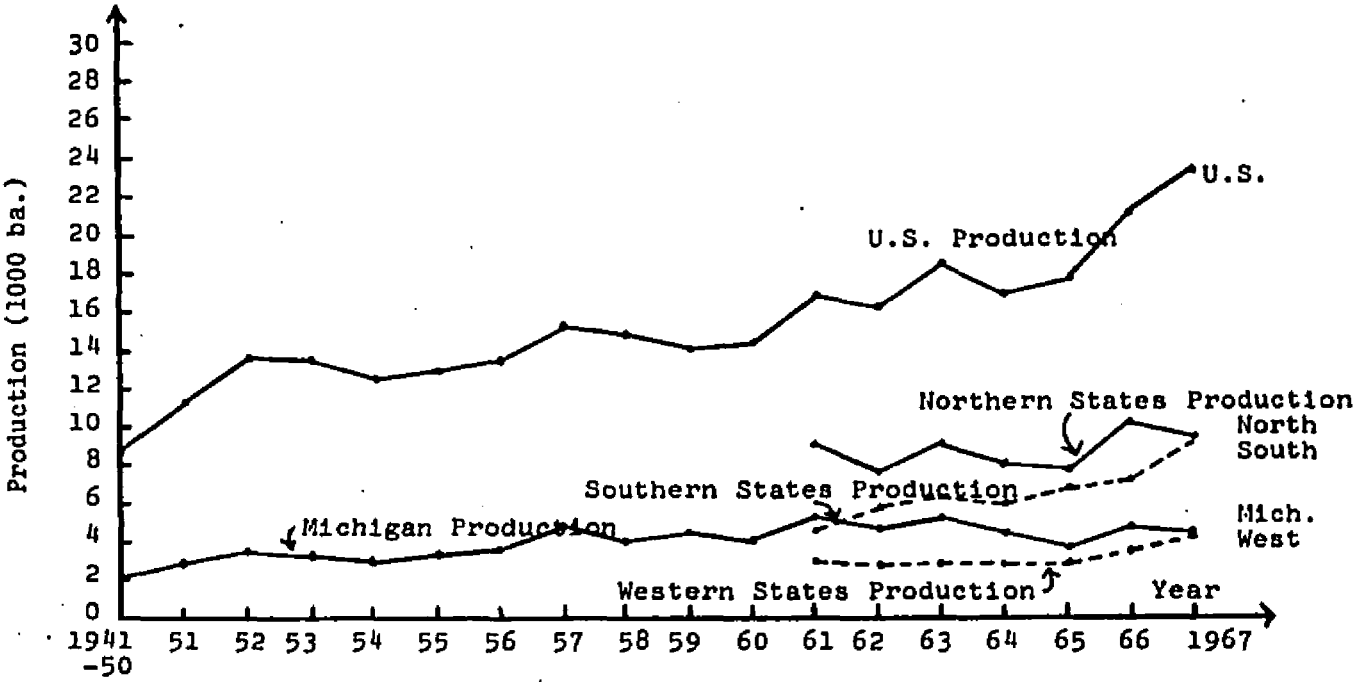

Fig. 17a.--Pickle production in the U.S., Michigan, and regional areas, 1950-67.

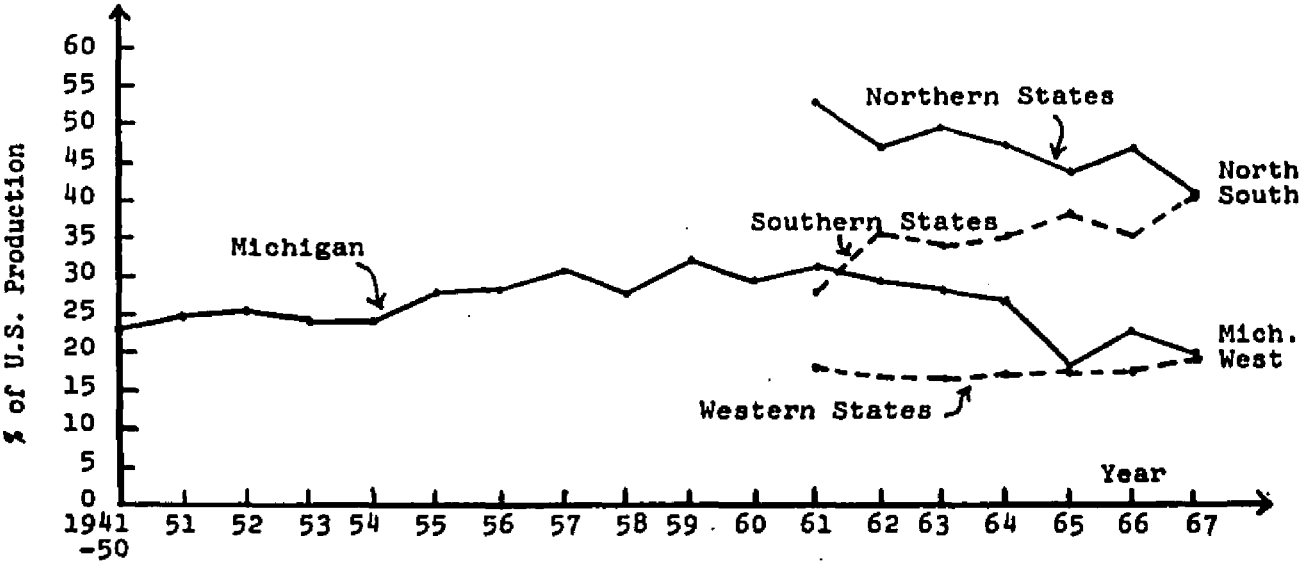

Fig. 17b.--Pickle production in Michigan and regional areas as a per cent of U.S. production, 1950-67.

and regional blockings of states, and these same figures as a percentage of total U.S. production of pickles.

As these figures indicate pickle production for the U.S. has been steadily increasing and, if anything, has increased at a more rapid rate since 1964. Michigan production however, appears to peak about 1961-1963, and trend downward thereafter. As a percentage of total U.S. production, Michigan experienced a peak in 1959, with the graph falling off following that year, and there could be an acceleration in the decrease following 1964. Using this graph it is interesting to note that Michigan's pickle production grew as a per cent of total U.S. production from 1954 to 1959, and then began a decline. In 1958, the U.S. Department of Labor started enforcing stricter standards on the use of braceros by the pickle industry in Michigan, and in 1962, "adverse effect" determinations were first implemented. These administrative steps made braceros more costly than earlier and appear to have been a cause contributing to the decline of Michigan pickle production as a percentage of U.S. production. Referring again to this graph, the reduction in the northern region is being made up by a slight increase in the western region and a fairly substantial increase in the southern region.

These data indicate that Michigan had been declining in its percentage of U.S. total production since the

early 1960's, and the post-1964 experience continued this trend and perhaps accelerated it slightly. As labor costs to the industry rose in the 1960's, two alternatives were open: mechanization and/or transference of acreage to states where labor costs were lower. As will be seen, the alternative of mechanization has been undertaken, but has not shown clear profitability. Thus the industry turned also to the second of the two alternatives.

The movement of Michigan pickle processors to southern states[1] for green stock has been a result of two major factors: (1) an increasing retail demand for fresh-pack pickles, thus favoring a longer growing season than Michigan can provide; (2) increasing labor costs in Michigan as compared with southern states. As the retail demand for fresh-pack pickles increased, Michigan processors began contracting acreage in southern states in order to lengthen the processing period for fresh green stock (see Appendix I). Thus even had labor costs remained unchanged some movement of pickle production out of Michigan would have occurred.

The predominant type of contracting in the South is on small family farms, sometimes less than one acre per

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[1]The western pickle industry largely can be neglected here. The northern and southern states compete for the market east of the mountains and great plains. The western states fairly well control their own market since transportation expenses preclude eastern competition.

grower, with each family supplying the labor. The green stock is then trucked to the plants in Michigan for processing. Under such arrangements processors are absolved from handling labor, and even when non-family labor is needed the costs often are lower in southern states. Also under such contracting arrangements processors can "over-contract," by signing contracts for more acreage than the processing plants will handle, assuming average yields. Since yields are very uncertain on such small acreages there is an economic incentive to do this in order to assure that enough green stock will be available. And in the event large yields result it is possible for processors to shift the cost of surplus production back to the growers. This can be done by rejecting green stock for minor difficulties; if a few growers were to be angered their loss would not amount to much acreage in the following year.

Offsetting these favorable factors for transferring acreage are several factors favoring Michigan. Probably most important is the fact that expensive processing facilities became located in the state during the bracero period, and this builds in a definite bias to Michigan production because of the transportation cost of trucking green stock long distances. Some processors contend that a Michigan pickle processes better than those grown in other states. Finally, if mechanical harvesting

could become economically profitable then this should favor Michigan because of the need for large acreages and controlled growing conditions, factors which a number of Michigan growers can deliver.

Conclusions

The conclusion which can be drawn is that a large shift in acreage to the South following 1964 did not occur. Perhaps there was a slight acceleration in a shift which had already begun, due to the need for green stock for longer periods of time, but there was no large shift as might be inferred from the stoop labor argument. Obviously the transference will be drawn out over several years, due to the fixed nature of capital in Michigan, in the form of processing facilities and marketing arrangements.

The implications of this analysis for the long run demand for domestic migrants are not entirely clear. If processors were to increase the transference of acreage to the South then migrant work opportunities in Michigan pickles would dry up; and this would have rather serious implications for other Michigan crops, due to the crucial position of the pickle crop in the sequence of the migrant season.[1]

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[1] If pickle companies bring fewer workers up, then under present arrangements fewer workers will be available to asparagus and strawberry growers. If pickle work drops out of the migrant pattern then a big hole is created,

Capital Substitution Changes

Hand labor is used at both the pre-harvest and harvest periods in pickle production, and there are possible ways of substituting non-labor means of production during both periods, given present technology. The economic feasibility of this capital substitution is not clearly established however.

During the pre-harvest period the pickle plant must be trained and the weeds removed. The most feasible non-labor means of control appears to be newer plant varieties--which grow more like a small bush than a sprawling vine--and chemical weed control. The new plant varieties also are intended to allow for much greater plant populations per acre, which serves to make capital substitution during the harvest period possible.

Two approaches towards eliminating hand labor from the harvest period are possible. One is the use of a mechanical harvester which completely replaces hand labor except for machine personnel. The other involves the use of picking aids. This method conflicts with worker desires to pick by hand during conditions of a scarce labor supply. Individual workers often can earn more picking by hand than picking communally, as the picking aids require.

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adding to the hole being opened by sugar beet mechanization. Apparently the cherry harvester is developed sufficiently to handle larger percentages of the harvest of that crop. The concurrence of these factors could dry up the work pattern sufficiently to make Michigan less favorable as a migrant state.

Mechanical harvesting then is attracting the major attention in the industry. As Appendix I indicates, the necessary factors making economically feasible the widespread adoption of mechanical harvesting, are larger yields per acre and an effective weed control chemical.

Prior to 1965 a few once-over mechanical harvesters were tested by various pickle companies on experimental fields, with no real economic profits expected. In 1965 and 1966 however some acreage was planted with the expectation of harvesting it mechanically for profit. Almost all fields harvested only with a machine involved economic loss because insufficient yields were obtained. Thus in 1967 machines were used largely after laborers had picked a field two or three times, and not all of these attempts were profitable. An indication of the unsure profitability is seen in the fact that several companies either had to rent land to obtain sufficient acreage for use of their machines or assure growers a set fee per acre regardless of the value of production.

To gain an idea of the rate of adaptation of the industry to machines, the questionnaire sought information on the amount of acreage harvested mechanically in each of the three years following 1964 (see questionnaire #23 in Appendix II). The responses indicated the percentage of acreage harvested mechanically doubled each year from 1965 to 1967, rising from 5.3 per cent of harvested

acreage in 1965, to 10.9 per cent in 1966,[1] to 20.7 per cent in 1967. These figures undoubtedly contain cases of mechanical harvesting after several hand pickings and thus the percentage of total production mechanically harvested may not match the percentage of acres that harvesters covered. The possibility of over-estimation of mechanization adaptation is reinforced to some extent by the fact that the responses to the questionnaire generally were biased towards growers who would be more likely to use harvesters. The reason for this is that the questionnaire responses probably included a higher percentage of larger growers than existed in the population for the state; and these same larger growers were probably more likely to use mechanical harvesters. It is doubtful that the rate of increase will be matched in 1968, although some increase is expected. Large-scale adoption must await further developments in plant technology.

The questionnaire also provided information on the increasing use of weed control chemical and irrigation,

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[1]Region V of the U.S. Bureau of Employment Security, Farm Labor Service, estimated that roughly 2,000 acres of Michigan pickles would be mechanically harvested in 1966. This prediction was made at the end of the 1965 season, based on talks with processing firms. According to USDA reports, the planted acreage in 1966 was 20,900 acres and the harvested acreage was 19,600, making the 2,000 figure roughly 10 per cent of planted and harvested acreage. See USDL, BES, FLS, "Region V Labor Developments, 1965; Michigan Pickle Harvest" (internal USDL mimeographed report, December, 1965), 31.

forms of capital substitution for pre-harvest as well as harvest labor (see questionnaires #18 and 21 in Appendix II). The questions asked for specific information about amount of use, but the responses were largely checks of whether there was use or not. Thus the only indication possible is the number of growers using weed control and irrigation in each year. Table 16 lists the "yes" responses as percentages of all usable questionnaires for each year, 1964-1967.

TABLE 16.--Number of users of weed control chemical and irrigation in Michigan pickles, 1964-1967.

Measure	1964	1965	1966	1967
Weed control chemical % yes	16.7%	25.0%	23.6%	28.0%
Irrigation % yes	17.7	14.3	21.5	25.6

In both cases there is an increasing amount of use in later years, though not as great an increase as for mechanical harvesting. When the amount of use is broken down by region within the state the southwestern region includes far more growers using both weed control chemical and irrigation than growers in other regions. There is virtually no irrigating done in the east-state area and very little in the mid-state area. Similarly, only a

small amount of weed control chemical use is found in the east and mid-state areas.

Conclusions based on these findings can only be tentative. As mentioned above, an increased amount of capital substitution can reflect the elasticity of demand as well as the inelasticity of labor supply. A rate of increase in the adaptation of mechanical harvesting of 50 per cent a year from 1965 to 1967, certainly appears to be a rapid increase. By itself this finding could suggest that the supply response might have been limited emough (and wages high enough) to encourage capital substitution.

As has been seen in the previous section however, this increase in capital substitution came at the same time there were increases in planted acreage in the state for 1966 and 1967. It could be therefore, that the increased mechanical harvesting was used on the incremental additions to acreage and was not necessarily a replacement for labor.

This conclusion gains support in light of the actual increase in total pickle employment (domestics and braceros) following 1965, to levels greater than existed in 1964. As Table 5, in Chapter II, indicates, estimated peak employment in pickles in 1966 and 1967, was 16,545 and 18,533 workers respectively. Estimated peak employment in 1964 was 16,309 workers (includes 12,843 braceros). If

the increase in mechanical harvesting seriously affected the demand elasticity in the short run, one might not expect such large numbers of workers hired in the two recent years.[1]

The increasing mechanization, even though not limiting labor demand severely in the short run, may portent a far more elastic long run demand for labor in Michigan pickles. The use of mechanical harvesters during these years following 1964 could well have provided the practical experience necessary for the successful adaptation in future years.

Impact on Pickle Prices

In addition to claims that the termination of braceros would seriously limit pickle production there were claims that large increases in retail prices of pickles would result, thus affecting the general public. In his follow-up report on the experience of 1965, the Secretary of Labor stated:

> Market prices for fruits and vegetables were, on the whole, less in 1965 than in 1964 . . . as always, the principal influences on consumer prices were things other than labor costs . . . Still to be determined is the pricing of cucumber pickles. Michigan producers and processors were clearly affected adversely by the change in labor supply sources.[2]

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[1] One additional reason for the increase in acreage in years following 1964 was a reduction in the productivity of workers.

[2] Secretary of Labor, Year of Transition, 3, 23, 25.

Pricing data on selected pickle products are graphed on Figure 18. These data are collected by the Bureau of Labor Statistics as part of the market basket from which the consumer price index is derived.

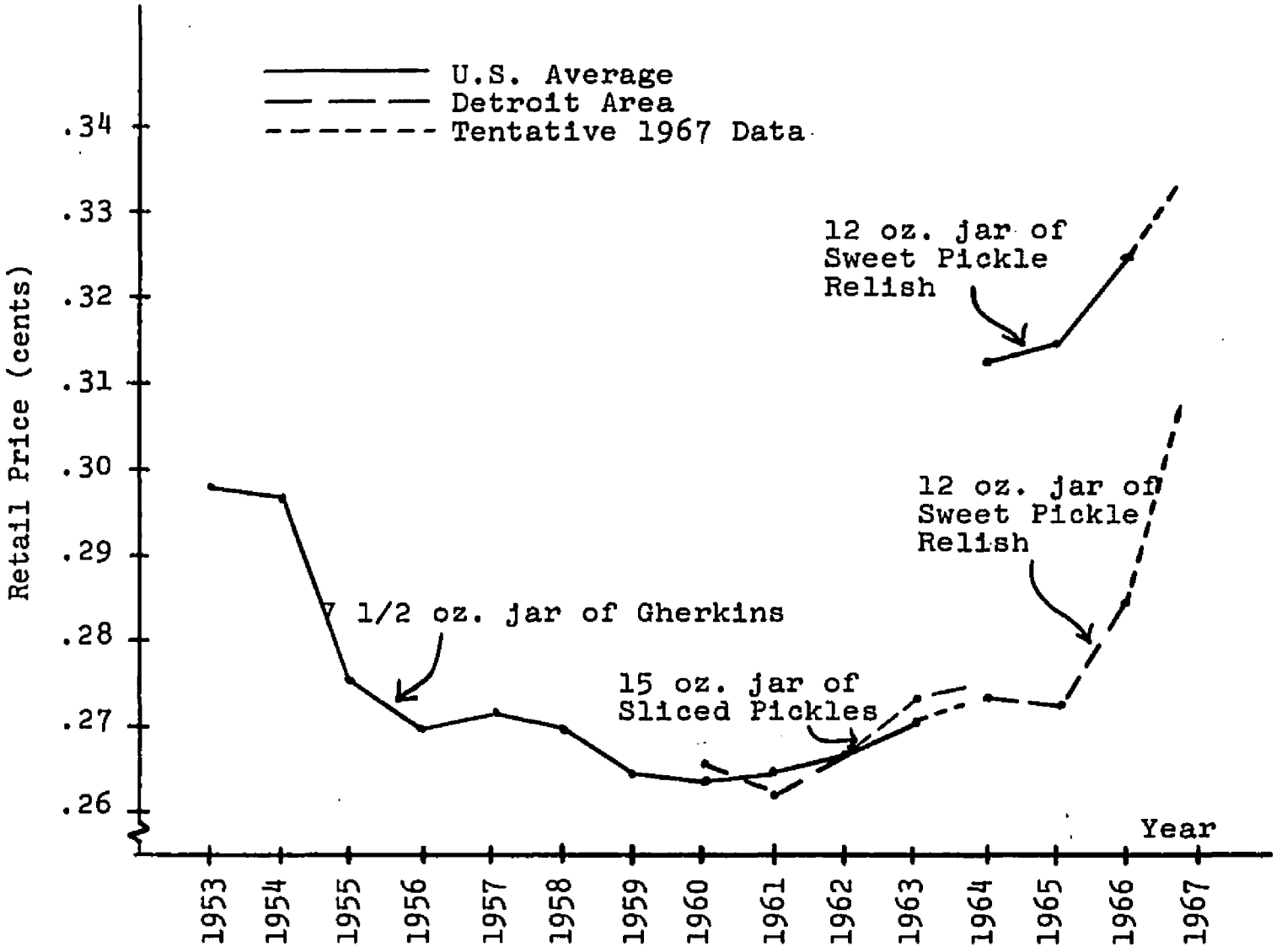

Fig. 18.--Retail prices of selected pickle products in the U.S. and Detroit marketing area, 1953-1967.

Since Michigan traditionally has been the largest pickle producing state, at its 1959 peak producing one-third of all U.S. pickles, the price data should reflect changes in the costs of Michigan pickles. It is interesting therefore to note that retail prices dropped with the influx of Mexican labor into the state with what appears to be a one year lag, and decreased through the 1950's as the number of braceros swelled. Then when the U.S. Department of Labor started raising the cost of bracero labor around 1960, prices started trending upward, and a fairly sharp rise occurred when the braceros left, again with a one year lag. The data for the Detroit area indicates similar trends for the shorter period.

Unlike many crops the labor cost in pickles makes up a fairly large portion of total costs, due primarily to the continued need for pre-harvest hand labor and the multiple picking at harvest. During the bracero years, especially prior to 1960, the wage rate relative to other crops was low and capital was not substituted as quickly, and labor costs per acre remained high. Combining this fact with that of a highly competitive market structure, both at the grower and processor levels, retail prices are seen to fluctuate closely with labor costs to the industry.

Contrary to the expectations of some observers, large price increases were not experienced in 1965. Planting decisions and contracts for that year were made

largely on the expectation of bracero labor and thus contracts with retailers would carry through this expectation. In 1966 however contracts to growers and workers reflected the increased labor costs and thus prices at retail would be expected to rise. The figures support this explanation.

CHAPTER VI

SUMMARY AND CONCLUSIONS

In the spring and summer of 1965 the Michigan pickle industry was told it no longer would be able to receive Mexican national workers. Due to the relatively late realization of this fact the industry was not able to recruit sufficient numbers of domestic workers in 1965; and the shortage in pickles bled into other migrant crops, as pickle growers and processors tried to hire labor from all sources. In 1966 and 1967, the pickle industry anticipated no foreign workers and participated in the regular winter recruitment, and for the most part obtained sufficient domestic labor.

The removal of foreign workers was accompanied by an increase in wages for all Michigan migrants statistically significant from earlier years in which braceros were used. In conjunction with the increase in wage rates there were noticeable increases in non-wage provisions of employment. The increases in wages and non-wage provisions suggested that the workers used in pickles following 1964 were substitutable with workers in other crops, and thus that domestic workers would do pickle work.

An attempt to discover possible causes of the wage rate increase by multiple regression analysis failed to turn-up significant correlation coefficients for the independent variables regressed against wages--although the correlation coefficient for the entire regression was high and significant. Undoubtedly the major cause of the wage rate increase was the termination of bracero use, as the theoretical analysis and field research indicated.

The increased wages appear to have set off two adjusting movements in the Michigan pickle industry: (1) an increase in harvest mechanization, and (2) a slow increase in the rate of acreage transference to southern states. There were a few serious adverse production effects in 1965 and no noticeable repercussions in 1966 and 1967.

Two conclusions can be drawn from these findings. First, the supply response of domestic agricultural labor to increased wage offers was far more elastic than expected. Industry personnel had argued an extreme version of the stoop labor thesis, and more sophisticated versions had been advanced by students of the labor market. Strong support for the thesis was not found in Michigan, even though in 1965 there was some difficulty experienced in obtaining labor. This empirical finding gave rise to several theoretical observations (Chapter III) concerning the nature of the supply curve of agricultural labor, and the workings of the migrant labor market.

Secondly, the ability of the farming sector to adjust to a severe institutional shock was borne out quite clearly. Prior to 1965, the pickle industry protested there would be little hope of quick adjustment to the removal of braceros. However within one year for most growers and processors, the adjustment was complete. And there is reason to believe, based on the experience of a few processors in 1965, that if the industry had fully realized early in 1965 the government's intent to keep braceros out, then the more adverse experiences may have been avoided.

Thus, the industry was wrong (1) in their understanding of the supply response of domestic migrants and (2) in their understanding of the industry response to the removal of braceros. Consequently, continued close reliance upon industry analyses for gearing public policies are put under suspicion. The private sector, both workers and employers, were far more efficient in adjusting to institutional shocks of the nature experienced in 1965 than most participants in and students of this labor market thought possible.

In addition to these main findings and conclusions the research allowed several other observations:

(1) The relative costs of braceros versus domestic workers was investigated and it was suggested that in periods of scarce labor supply the costs were fairly similar, though when labor supplies became more abundant

braceros cost more. The additional cost however was in payment for greater certainty of labor availability.

(2) The wage determination process was examined and several observations were made. A low wage for agricultural workers is not necessarily a sign of imperfections in the market, but more likely the result of abundant labor supplies. In addition, the bracero program was seen to tie wage levels to a historically determined figure, the one prevailing when braceros were first admitted to the domestic farm labor market.

(3) Several reasons are given to explain the poor recruitment success of the Michigan pickle industry in 1965, notably a late start and an industry unprepared psychologically and physically to recruit successfully.

(4) Pickle prices seemed to follow rather closely, and with a one year lag, movements in labor costs (and bracero availability) to the Michigan pickle industry.

Some Implications

In Chapter I the problem of adjustments in the seasonal labor market of Michigan agriculture was discussed in the context of two public policy issues: a sufficient labor supply in agriculture and poverty among migrant workers in the United States. Drawing upon the findings of the research in Michigan it is possible to make selected observations on these two policy issues.

Labor Supply Problem

This problem, at least for the more isolated case of Michigan pickles, was the subject of the thesis. Michigan growers of migrant crops will continue to need, and thus demand, relatively large numbers of farm workers for many years after 1967 (the terminal year of this study). A similar conclusion has been made by other students of the agricultural labor market:

> Whatever else may happen--higher wages, unions, collective contracts, or even unemployment insurance--agriculture will still require large numbers of temporary workers . . . . The day is still far off when biologically seasonal crops will be handled by regularly employed, year-round personnel.[1]

Therefore it is reasonable to expect a recurring complaint of insufficient domestic help from employers of migrant labor.

A conclusion of this thesis was that grower's complaints about labor shortages, and inelastic worker supply responses to increased wage offers, proved unfounded in Michigan agriculture following 1964. It might be instructive therefore, to consider cases of continued importation of foreign laborers in other states,

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[1]Varden Fuller, "A New Era for Farm Labor," Industrial Relations, 6 (May, 1967), 293. See also: Fred Schmidt, "After the Bracero: An Inquiry into the Problems of Farm Labor Recruitment," Institute of Industrial Relations, University of California, Los Angeles (mimeographed, October, 1964), 29; John Mamer and Varden Fuller, "Labor and the Economic Factors in Fruit and Vegetable Harvest Mechanization," Agricultural Science Review, 3 (Fourth Quarter, 1965), 1.

in light of this finding. Table 17 shows the states which were authorized to use foreign workers in 1967 and the peak number of foreigners used.

TABLE 17.--Estimated peak employment of foreign workers in U.S. agriculture by state, 1967.

State	Peak Emplmt.	State	Peak Emplmt.
Florida	9,000	West Virginia	400
California	6,100	Massachusetts	400
Main	3,200	New Hampshire	400
New York	900	Vermont	200
Virginia	700	Connecticut	100

Source: Bureau of Employment Security, Office of Farm Labor Service, Farm Labor Developments (February, 1968), 53.

Federal officials of the Farm Labor Service, in personal interviews, suggested the following reasons why foreign workers were used in years subsequent to 1964:

(1) In certain areas, namely the New England states and the Virginias, perhaps California, the political consequences would be too great if foreign workers were removed.

(2) In other areas, primarily Florida, the work was so difficult and unpleasant it was not seen as desireable to rely on domestic workers.

(3) In still other areas, especially Maine, dire economic consequences would be suffered from removal of

foreign workers. Maine is so far from the regular migrant streams that domestic workers would not come for the potato harvest, and the ground is so rocky that mechanical harvesting is not possible.

The experience in Michigan subsequent to 1964 would provide little basis for comment upon the first reason cited, political infeasibility. The second argument for importation of foreign workers is a modification of the stoop labor argument. The original form, which the Michigan experience discounted, stated that workers would not want to do such disagreeable work as pickle picking. Consequently there would be an inelastic supply response of domestic workers to higher wage offers for that activity. The form of the argument put forth above is that government officials would not want domestic workers to do the given type of work. Thus foreign workers are imported and wages for domestic workers remain lower than they otherwise would be.

If the Florida case is similar to Michigan, the alternative to foreign workers would require growers, in this case large sugar cane companies, to bid up wages in order to attract domestics. At the higher wages, domestics would have the choice of working in non-sugar crops at higher wage levels than existed when foreign workers were used, or to work in the sugar fields at higher wage levels than paid foreign workers. It appears to be a strange

"concern" for the welfare of domestics which would deny them higher wages or the choice to determine for themselves what is undesireable. One suspects therefore that political reasons also determine the use of foreign workers in Florida.

The third argument for foreign worker use, that to remove them would cause undesireable economic consequences, is the same argument advanced by the Michigan pickle industry prior to 1965. On the basis of the Michigan experience the adjustment for the pickle industry did not appear nearly as serious as predicted. Domestic workers responded in greater numbers than expected, and growers and processors were somehow able to adjust without suffering great losses--except for some growers in 1965. Indeed most of the "suffering" which did occur was a result of uncertain governmental policies which led to false expectations within the industry.

Prior to 1965 few observers were willing to suggest that domestics would pick pickles, just as few are willing to admit that migrants would ever venture to Maine to dig potatoes. So long as foreign workers continue to be imported, domestic migrants will never have that opportunity, and wages to domestics will remain lower than if foreign workers were removed. An essential fact stemming from the Michigan experience is that regardless of how knowledgeful of the given situation certain observers may

be, it is virtually impossible to predict the types of adjustments among workers or industry personnel.

Poverty Problem

The poverty among migrant workers is one of the most well known and oldest of America's social problems. In 1953, Fisher wrote:

> The plight of the agricultural worker and in particular the migratory agricultural worker has long made a strong appeal to the American conscience . . .
> . . . . . .
> The most common expression of this conscience is the perennial study of the conditions of migratory labor accompanied by recommendations for their alleviation. The number of such studies is staggering.[1]

The President's National Advisory Commission on Rural Poverty, which issued its report in September of 1967, was another of these numerous studies.

The research for this thesis supports the observation made elsewhere that the root cause of the poverty is found in the abundant numbers of workers subjected to agricultural work as the only employment alternative.[2] Thus when braceros were removed from Michigan, shrinking available supplies, wages to domestic workers increased significantly. Unfortunately this "cause" of low wages

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[1]Fisher, The Harvest Labor Market in California, 139, 140, 141.

[2]See, e.g., Lamar Jones, "Farm Labor: Shortage of Surplus?" The Southwestern Social Science Quarterly, 47 (March, 1967), 401.

for migrants is often clouded in the public's mind by popular treatments of the poverty problem which cast blame on growers. Certainly grower callousness has contributed to the misery of many migrants, but the roots of responsibility are deeper than this. Other segments of society also share the responsibility.

As has been noted above, the seasonal labor force of agriculture is by no means a clearly defined, homogeneous body of workers. There is a central core of "professionals" but a large fringe of marginally attached workers. Recent evidence has pointed to the "ease" with which workers in the non-agricultural sectors of the general labor market can be flushed into agricultural work.

> Clearly, the agricultural labor force has become a shock absorber for the nonfarm labor market. The burdens of deficient demand conditions in the nonfarm economy and structural change in the nonfarm labor market in part have been placed on members of the farm labor force.[1]
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> . . . it is clear that the failure of relative earnings of hired agricultural labor to rise between 1957 and 1960 is . . . the result of an influx of workers from other industries.[2]

To the extent larger segments of the population discriminate in hiring and other employment practices

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[1]W. Keith Bryant, "Demand and Supply of Agricultural Labor in a Period of Social Change," Journal of Farm Economics, 46 (December, 1964), 1250.

[2]Lloyd Galloway, "Mobility of Hired Agricultural Labor: 1957-60," Journal of Farm Economics, 49 (February, 1967), 45.

they thereby contribute to poverty among migrants, for this swells the ranks of those at the bottom of the labor force. To the extent the Farm Labor Service spends more energy in helping growers harvest fields than helping laborers arrange completed work patterns this also contributes to poverty.[1] The tenacles of responsibility seep far beyond the employers of migrants.

The measures that are needed to help alleviate poverty are those which will dry up the supply of migrant workers. A few of these have been implemented by the federal government directly in such programs as Head Start and the Manpower Development and Training Act, and indirectly through an expansionary fiscal and monetary policy. Other programs have been enacted to help migrants, such as minimum wage and housing legislation. For the most part these latter types of programs deal with the symptoms of the problem rather than the cause. To the extent they raise the cost of labor they may serve to intensify the problem for numbers of migrants.

The research of the thesis was not specifically structured to deal with poverty among migrants, although

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[1] "It is becoming more evident that recruitment efforts need to encompass planning to maximize the length of work season and work time for migrant laborers. This requires closer coordination among recruitment agencies, farmers, and crew leaders." William Metzler, Ralph Loomis, and Nelson LeRay, The Farm Labor Situation in Selected States, 1965-66, Agricultural Economics Report No. 110, USDA, Economic Research Service (Washington: Government Printing Office, April, 1967), 32.

the examination of the labor market has allowed comments on this policy problem. Perhaps the ultimate value of the thesis will lie in how much it contributes to an understanding of poverty among agricultural farm workers, and how to alleviate this problem.

APPENDICES

APPENDIX I

INSTITUTIONAL NATURE OF THE AGRICULTURAL PRODUCTION FUNCTION

APPENDIX I

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The purpose of this appendix is to provide a descriptive analysis of the agricultural production function as it gives rise to the demand for seasonal labor. The coverage is restricted to Michigan agriculture and there will be an emphasis upon the pickle industry, due to the large employment of braceros in pickles. First there is a discussion of the production situation generally applicable to all crops, and this will be followed by comments for selected crops.

General Nature of Production

The pay-off for the agricultural "firm" comes when the product gets out of the field and into the hands of the buyers. For most crops the production process begins when the seed is planted in the spring. For fruits where the tree, vine or bush remains year after year, the process is already underway with each new budding. Prior to the beginning of the production process the grower must make the decision as to which crop will yield the best expected pay-off, given the constraints on acreage, financial resources, state of technology, and foreknowledge

of the market situation.[1] Once that decision is made and the land is committed then all efforts are directed towards attaining the maximum yield possible, for this increases the expected dollar returns.[2] For selected crops, like sugar beets and pickles, the land is tied-in early in the spring or winter by signing a contract with a processing company to grow a specified amount of acreage.

Two major risks are encountered by the grower in guiding his particular crop(s) through the production process, the growing risk and the market risk. The first of these, the growing risk, is the yield problem already mentioned. Numerous factors arise during the period of production to plague growth, not the least of which is weather. A late cool spring can retard budding on fruit trees. Wet weather can retard planting as well as accelerate weed growth. Dry weather is even worse, as it

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[1]"Because farmers don't know what prices will be, it is useless to assume that they actually maximize profits. On the other hand, it is not useless to suppose that they try to improve profits given their information about the past and their uncertain guesses about the future." Richard H. Day, "The Economics of Technological Change and the Demise of the Sharecropper," American Economic Review, 57 (June, 1967), 427.

[2]Since the individual grower has so little control over the total industry supply, the only way he can control his return (after the decision to plant is made) is to influence the yield, and hedge that other growers will not have as much success. Even in concerted efforts to restrict supply, the restriction is on acreage, and the incentive for greater yield per acre remains paramount.

restricts the growth of plants. And there is always the possibility of wind, hail, and frost. A few of these growing risks are controllable. Dry weather can be countered by irrigation and wet weather by tiling and ditching of fields. Some wind damage may be controlled by lining the fields with trees or planting "cover" crops, for example, barley rows to protect young onion and lettuce plants. Still the production process is critically dependent upon favorable weather for a strong yield.

Other common growing dangers include disease, insects, and weeds, all partially controllable by the use of chemicals. For crops still requiring hand labor in weeding or blocking[1] there is the risk that labor may not be available. Other growing risks peculiar to the particular farm always exist, for example, machinery breakdowns, an overdose of chemicals, failure to irrigate sufficiently, and others, but the major common risks are the natural ones of weather, disease, insects, and weeds.

The amount of growing risk varies with the crop. Pickling cucumbers, for example, is deemed more risky than snap

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[1]Blocking is the word used to describe the process of thinning plants along a row so as to give more room per plant for growth. To assure a continuous row of plants, more seeds than are needed are placed into the ground, and then the unnecessary plants are "blocked" shortly after plant emergence.

beans (an alternative crop for similar land) because of the effect of weather on yield, as well as the succeptability of the plant to certain diseases. And pickling cucumbers generally return a better profit with sufficient yield than does snap beans, reflecting the greater risk.

The market risk refers to the potential of a good dollar return for the crop once the yield is established. The two risks merge at the harvest period. For most crops the yield is generally set once harvest begins, so long as the harvest is conducted efficiently. For a few the harvest process vitally affects the yield; in pickles, the number of "picks" influences the number of new pickles the plant will produce, fewer pickings reducing the number of pickles produced. In addition, too cool summer evenings can seriously limit the maximum yield from a field of pickles.

The culmination of the growing period is the harvest when the fruit is collected and either sold directly or stored for later selling. The harvest process is characterized as a "pulling out all the stops" process; regardless of the cost, get the crops in. For the grower, psychologically, it promises the reward for a long period of work, as well as the hope for the next period of work.

It is at harvest time that the labor need becomes greatest. The more fruit picked and delivered the more money forthcoming. Generally, the more laborers in the

field the more fruit delivered. So long as growers do not bear the cost of worker unemployment then a strong incentive exists for employing many workers to assure a quick and total harvest.[1] Too few workers may mean only the large fruit will be picked and the crop may not be harvested before "field spoilage" or "market spoilage" sets in.

Perishability (field spoilage) is a real danger if crops are allowed to remain unharvested too long. Some crops are relatively unaffected, for example, sugar beets, onions, and potatoes, but others rapidly deteriorate. The case of pickles was discussed above: harvest slothfulness means fewer fruit. Tree fruits may spoil while on the tree or fall off and become damaged if left on too long. Because of the danger of field spoilage, there in an incentive to harvest the crop quickly to protect the yield developed during the growing season.

Market spoilage, or market risk, refers to the problem of getting a crop to market to assure a good price. Since prices turn on the supplies available the timing in bringing a crop to market is crucial. Often the price is good early in the harvest period and then weakens as larger supplies flood the market. This creates an additional incentive to harvest quickly.

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[1]See the discussion of this point both in Chapter III above and in Fisher, The Harvest Labor Market in California, Chapter 1 and the supplement.

Much of the market risk can be avoided by contracting before the crop is grown, as is the case with pickles. Growers sign agreements specifying price before the planting begins and then the pay-off turns on the yeild produced and harvested. A few growers of pickles grow without contracts for the "open market," hedging that the contracted growers will not produce enough to meet the needs of the pickle companies and then open market pickles will bring a premium price: the case in Michigan in 1966.

Weather can affect the harvest process in the same way as it affects the growing process, by retarding the rate of harvesting. A good example is rain, during which workers are reluctant to enter the fields, and machines often are prevented from working due to soft ground.

For crops sold directly upon harvesting, the market risk often is greater than if storage is possible. Tart cherries are sold from tree to processor, and if processors are filled up then orders fall off, harvest stops, and workers wait. Later the orders may begin again, but good fruit may have been lost by then. Apples, once harvested, can be stored to wait for the "right" price.

In all cases, however, the labor demand throughout the entire production period is a discontinuous one. During most of the growing period little demand exists, except for selected crops, and then suddenly a large harvest demand arises which may terminate shortly thereafter.

And situations like poor weather or failure of processors to accept the crop can terminate the labor demand instantaneously within the harvest period.

Labor Demand for Selected Crops

In the following paragraphs the situation for selected crops still requiring large amounts of seasonal labor is discussed. The state of technology varies quite rapidly and unevenly among crops, and therefore all new developments cannot be mentioned and only brief comments are made.[1]

Reach-Up Crops: Cherries and Apples

The production process for both cherries and apples begins in the spring with the pink and white blossoms. Bud development can be affected by the weather at this crucial stage, enough so as to cut the potential yield appreciably. The cherry tree develops its fruit to a stage of maturity by the middle of July, while the apple tree matures its fruit much later, by late September, and into October and November.

The cherry harvest is usually concentrated into a three week period, covering the last two weeks of July and

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[1]More current information for various crops is available from the Cooperative Extension Service, USDA, Michigan State University. Of note for this purpose is a series of publications under the title Project '80: Rural Michigan Now and in 1980, Research Reports Nos. 37-52, Agricultural Experiment Station, Michigan State University (East Lansing, 1966).

the first week of August. Waiting too long may result in over-ripe fruit and "dropped" fruit. A particular danger is wind-whipping which results from watery winds off Lake Michigan bruising the fruit. Recently developed is a machine for "shaking" cherry trees, the fruit being caught by a wide apron spread beneath the tree. This process has made considerable inroads upon the picking of fruit to be processed, due to the lack of concern over bruised fruit resulting from the machine. Fresh market cherries are not shaken, however.

The apple harvest comes in fall amidst the changing colors. The major obstacles to the harvest have been inclement weather and labor scarcity. While the cherry season falls at a prime time for making use of labor, following strawberries and before pickles, the apple harvest is the last crop of the Michigan season and is easily skipped by migrants if other opportunities exist. The weather is cold and children must be kept out of or transferred among schools if migrants remain in Michigan through the apple harvest. With the increase in mechanical harvesting of large labor-using crops prior to apples, a fairly long layover period is developing, also weakening the drawing power of apples for migrants. The tree shaker can be used on apples but has proven less profitable; once the apple is bruised it deteriorates quickly, so the use of the shaker is limited to apples to be processed

immediately, which involves a far smaller percentage of apples than of cherries.

Another large labor-using crop involving somewhat less strenuous work is blueberries, grown along the western coast of the state from Berrien to Oceana counties. The blueberry bush provides relatively easy picking conditions and thus has attracted larger percentages of women and children than either cherries or apples. The harvesting season runs from the last week of July through the first week of September, a period conflicting with cherries, pickles, and tomatoes. A bush shaker has been developed, similar to the tree shaker described above for cherries, which is making large inroads on the percentage of berries harvested, approaching 50 per cent of harvested production.

Stoop-Down Crops

The asparagus and strawberry plants, like the tree and bush fruits, are perennial. They are the two earliest crops in the Michigan migrant season, maturing their fruits in May and June respectively. A late cool spring then directly affects the growth to maturity of these plants. There has been research work completed on the mechanical harvesting of asparagus, though not entirely successful at present. The machine cuts off and lifts the fruit into a box or bin for later packaging. The

strawberry plant however, similar to the apple, has not lent itself to mechanical methods of harvesting. The picking process--as backyard gardeners know--involves crawling (or a walking stoop) along the rows gingerly detaching the fruit from the plant.

Sugar beets was one of the earliest and until the last decade the largest employer of seasonal labor in Michigan. This crop is grown entirely under contract with three large processing companies operating in the state.[1] Early in the growing period the plant requires weeding and blocking in order to assure a good growth for a large yield. Traditionally both practices have been accomplished by hand, using a hoe to dig out weeds and extra plants alike. Recently, precision machine planters and blockers have been limiting the need for blocking labor, and chemicals have been developed to control weed growth. The control of the growing process has not advanced sufficiently, however, that hand labor is no longer required, and the beet companies continue to recruit laborers for June and July work. The harvesting of beets, earlier a combined process of pulling, topping (chopping off tops), and loading the beets for transport to the sugar refineries, now has become completely mechanized.

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[1]The operation of the contracting process, both with growers and labor, is quite similar to that in pickles, which will be examined in detail below.

The tomato plant grows close to the ground with a sprawling vine, similar to the pickle plant. This fact makes the use of machines driving through the fields particularly hazardous. Like the sugar beet, weeds must be controlled, which is usually accomplished by chemical application. The processing tomato crop is much larger than the fresh market tomato crop in Michigan, with the harvest season running from August through early October, though concentrated in the last week of August and the first few weeks of September. There have been two major impediments to mechanical harvesting of tomatoes, (1) an inability to develop a harvester that will pick only the ripe fruit leaving the vines and other fruit undamaged, and (2) an inability to develop a plant which will mature all fruit on the vine roughly at the same time. Machines are being used in other parts of the U.S. where more uniform growing conditions have been achieved. A machine has been introduced into tomatoes of the Michigan area, but has not made much impact on the total percentage of fruit harvested.

Pickle Industry[1]

Life of the Pickle

For most pickle growers in the state, the production process begins in the winter months when they are contacted by a field agent of a pickle company or green stock buyer.[2] The crop promises good money but also contains a fairly high growing risk. In spring or early summer the cucumber seed which is supplied by the company but bought by the grower is planted and the nursing begun. The plant grows as vines stretching out along the ground away from the root. The fruits emerge from flower blossoms at different spots along the vine, producing at different rates. The fruit attains its marketable state when quite small, made up of a narrow mushy inner core of seeds surrounded by a fairly rigid skin, and merely increases in size with age. If undamaged the vine has an active fruit life of about five to seven weeks. During this time if a fruit is

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[1]For a more thorough examination of the Michigan pickle industry see a Master's thesis prepared by Noel Stuckman, "Some Economic Aspects of Increasing Pickling Cucumber Yields in Michigan," (unpublished M.S. thesis, Michigan State University, 1959).

[2]When the pickling cucumber is first picked and before it is either processed into a pickle or placed into a salt solution (brine) for later processing, it is termed "green stock." All pickle companies have their own agents who contract for acreage. In addition, certain individuals deal only in green stock, in turn selling it to the pickle companies who failed to get adequate supplies from their contracted acreage. These latter entrepreneurs are called "green stock buyers" in this paper, and are variously termed buyers or briners in the trade.

removed from the vine, then a replacement fruit will grow. Leaving a fruit on the vine to grow to a large size reduces the time available for that "spot" on the vine to produce more fruit and seems to weaken the ability of the vine to produce fruit at other spots. Consequently, removing the fruit when small serves to increase the total number of fruits any one vine will yield.

The care of the growing plant still requires pre-harvest hand labor. Since sprawling vines do not allow machine cultivating beyond the first few weeks, weed control must be achieved by hand or chemical; the latter only presently is being developed successfully. Also, the vines must be "trained" which involves keeping them from sprawling around one another, which could limit production. Of late, the development of new plant varieties which sprout a much more limited vine has been undertaken to facilitate mechanical harvesting.

The diseases and insect problems peculiar to pickling cucumbers are: angular leaf spot, powdery mildew, scab and mosiac, and the insects that both carry the disease and feed on the plants, cucumber beetles and aphids.[1] There is continued work at Michigan State University as well as among a few pickle companies to perfect plant varieites

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[1]For a more detailed discussion of the various diseases and insects found in pickles, see Stan Ries, "Growing Pickling Cucumbers in Michigan," Extension Folder F-191, Cooperative Extension Service, Michigan State University (East Lansing, 1963).

immune to these diseases, as well as chemical control for both diseases and insects.[1] The yield is also affected by weather. As with all crops sufficient water is necessary; thus growers who have controlled moisture via an irrigation system can be assured of consistently larger yields so long as other factors do not interfere.

Once the pickle plant endures the rigors of growth and arrives at the harvesting stage, laborers are sent into the field to stoop down and turn the leaves of the prickly vines to pick the tiny fruit. The retail market for pickles places a higher premium upon the smaller pickles and, therefore, the ideal harvest period is one in which the fruit are picked (without destroying the vines) while small. Thus, every time through a field, all but the very smallest fruit are picked. A six week harvest period can easily involve twelve harvests, two a week. Near the end, however, the plants slowly give out and the fruit per picking becomes far less plentiful.

Efforts to design mechanical harvesters have been undertaken from the early 1950's, but successful adaptations have come only since the middle 1960's, and

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[1]One insect, the bee, is vitally necessary to the development of fruit, transporting pollen from male to female plant flowers, each implantation yielding a fruit spot. A part of pickle production then has been the hiring of bees, usually on a custom basis, to work the fields in preparation for the laborers.

widespread commercial use appears at least beyond the 1960's.[1] The first efforts were spent in developing a multiple-pick machine that would work through a field selecting only fruit above a given size and leaving the less developed fruit--as well as the vines--behind. The major problem was the condition of the smaller fruit and vines remaining, of such a state as to seriously limit further production. These efforts were scrapped, except for a few hangers-on, about 1961 and the development of a once-over mechanical harvester begun. This machine harvests everything on the vine leaving a field ready to be fitted for the coming year. Too often the machines also have collected rocks, weeds, leaves, and vines as well as the fruit, thus requiring additional labor in separating out the undesirable elements.

By 1968, the development of the once-over harvester appears to be as ready as it can be,[2] and the deciding factor for commercial adaptation remains (1) developing

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[1]The most current research on mechanization for the state lies in unpublished work conducted by Clark Nicklow, Department of Horticulture, Michigan State University. Also, see B.A. Stout, et al., "A Once-over Mechanical Harvester for Pickling Cucumbers," Quarterly Bulletin, 46 (February, 1964), Agricultural Experiment Station, 420.

[2]Three manufacturers are producing these machines in the United States and prices range from $15,000 to roughly $30,000 per machine. One company contends the labor savings will be 40-4, another more on the level of 80-4, and they each boast varying speeds. Presently there is a great deal of field adjustment work necessary, and the drawing boards are far from folded-up.

a plant variety which will yield a lot of fruit all at once, thus increasing the per acre yield,[1] and (2) developing an effective weed control chemical. The uses of the harvester in the 1967 season typically were after two or three hand harvests so as to increase per acre yield as much as possible.

At the same time that mechanical harvesters are being developed, mechanical picking aids are being tested and used. These are devices which seek to take away the onerousness of the work by providing riding beds for workers to either sit or lie on while picking. The devices usually are long narrow affairs spanning numerous rows of plants and drawn through the field by a tractor; the "booms" of pickers stretch out on either side of the tractor. The aids usually include a power driven belt on which pickers place the fruit to be channeled to a central dumping spot behind the tractor, where the fruit is loaded into large boxes.

From the field the green stock is transported to grading stations, located at selected farms or at a processing plant. There the greenstock is separated by size

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[1]Present plant varieties need space in which to sprawl out and develop. If less sprawling plants which yield many mature fruit at one time can also be placed closer together in the field, then this will bring nearer the commercial adaptation of machines.

into four standard grades,[1] each of which has a unique price as set out in the contract; smaller grades bring higher prices. Once picked green stock must be graded and processed relatively quickly, within two days, or else the fruit deteriorates, becoming mushy and losing color. Green stock picked in the South has been transported to Michigan processing plants by trucking the fruit directly from the field north. To maintain the quality, ice is placed under and around the fruit while in the trailor of the truck.

From the grader either of two processing steps are taken. Some green stock goes directly into the plant production process to be bottled as fresh-pack pickles. The remainder is dumped into huge vats to which water and salt are added, to make a brine solution. The "brine stock" remains in the vats usually from three to six months and then is removed for further processing into pickles of one form or another, for delivery to the shelves of the grocer.

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[1]Standard grades were legislated by the state of Michigan in 1965, creating four sizes from a menangerie of different sizes and typically seven different grades. Processors made a practice of changing grade sizes by 16ths and 32nds of an inch each year in an effort to confuse both growers and workers. Though the law stands, the old graders with seven cut-off points also stand, and processors are known to pay premiums for sizes other than the four standard ones.

Industry Organization

In order to understand the pressures on the seasonal labor market in the pickle industry, the examination can begin at the other end of the long process between cucumber seed and the grocer's shelve. Unlike many foods the income elasticity for pickles appears greater than unity, especially considering the fact that pickles are an "extra" to the diet rather than a necessity.

Long the most popular "single" pickle product is the sweet pickle, the tiny cucumber which is either sliced or kept whole and mixed with sweeteners. The dill, in one product form or another, has been the largest seller, however. Traditionally, grandmother's dill pickles were made by putting fragments of the dill weed into the brine solution with the pickle and aging: the "genuine" dill. However, the public failed to accept jars with "weeds" and a cloudy liquid and, until recently, most of the dills obtained on the grocers' shelves have been the "processed" dill, a pickle which has been in a brine solution for about three months and then placed in a jar with dill extract for flavor. The dill gaining more popularity today is the "fresh-pack" dill, a cucumber fresh from the field which is placed in the jar with dill extract and other spices and sealed: called variously fresh-pack, Kosher, or Polish dills. To the taste the fresh-pack is firmer and more crunchy and has a less strong dill flavor.

Supplying the fairly consistent consumer market are the many retail outlets, dominated today by the major supermarket chains. Most of the chains buy directly from the pickle companies, but supplying the smaller retailers are wholesalers who buy from the pickle companies and then resell to local stores. The prized accounts for the pickle companies are the large chains because of the volume. This creates a relatively oligopsonistic buyer situation facing pickle companies. When a retail outlet is "out" of pickles this could well lose valuable business. The pressure then quickly swells backward to get a shipment of pickles. The more competitive processors must meet rigorous time schedules to maintain their large volume contracts. This pressure is then translated downward.

The next link in the chain leading to the laborer is the processor, operating in a relatively competitive market situation, though one in the midst of merger activity.[1] Michigan possessed about 40 processors in 1967. A number of these were small, often restaurant-sized, operations. A few companies with processing plants in other states contracted acreage in Michigan.

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[1]During the 1960's a number of the larger processors in the state have merged with various partners. The Borden Company absorbed the largest processor, and other mergers have included paint companies and food companies. There have also been absorptions of some of the smaller processors by larger ones.

To the pickle growers of the state, the pickle processor has represented an oft-times schrewd, if not dishonest, businessman who nevertheless offers them a profitable deal so long as their yield is good. Prior to the bracero period of the early 1950's, processors contracted much more with numerous small growers, sometimes for less than one acre, who would then have their family prepare and harvest the crop.

When the braceros became available (roughly at the same time that the retail market was growing to absorb a larger production) the pickle companies moved into large scale management of labor. Thus contracts to growers changed to reflect the company costs in supplying the labor to both train and weed the vines and pick the pickles. The contract used almost unanimously was a 50-50 contract, the workers receiving 50 per cent of the value of the crop paid the farmer; the grower received the other 50 per cent less any items like seed supplied by the company. The value of the crop was established in the contract by the prices the processor agreed to pay for different grades of green stock. The price was not uniform for all pickles received but a graduated price structure, paying higher premiums for the smaller pickles. Under this payment scheme, the workers had an incentive to pick the smaller pickles where the value, of which they received half, was greater. An excess labor supply situation was

generally seen in a lowering of the contract prices, or reduction in the size of grades, but not the percentage of the crop received.

As labor costs rose different contract methods were used, adjusting both the percentage of the crop received by workers and the price structure upward. However, as labor costs rise, the smaller pickles become more expensive to the processors. Thus a scarce labor supply should be reflected in higher prices for pickles as well as fewer of the small pickles in the jars.

The costs to processors include a large fixed element in the processing plant, made up of processing machinery, brining vats and storage space, as well as a small staff, and a seasonal set of variable costs, the largest of which is seasonal labor employed to work the fields. Also on a seasonal basis are field men for the companies who line-up contracts for growers and workers early, and then supervise the growing and harvesting process. Most companies provide services like trucking and harvest containers, which add to costs.

The change from the processed dill to the fresh-pact dill has eliminated certain costs to processors, notably the storage vats and steps involved in brining, but the intensity of activity at harvest time has been stepped up. Before, green stock could be dumped into vats and processed as the pickle orders came in. In preparing

fresh-pack, the green stock must be processed immediately, which intensifies the activity at the time of harvest and creates a situation where a number of production lines are needed at one short period which will be done for large parts of the year. This favors two developments: (1) contracting in different parts of the country where the harvest period is different from that in Michigan; (2) diversifying the operations of the processing plant so as to make processing of other crops at other times of the year possible--both favor larger processors. The larger processors today seek to operate with fresh green stock from June 1 through October 1, obtaining the produce from the South early, then switching to the Michigan crop, and then returning to the second planting in the South for later produce. The remainder of the year they operate on brine stock, processing out sweet and sour pickles and processed dills.

The grower of pickling cucumbers ranges from the very small family operation of one or two acres to large operations of over one and two hundred acres. Except for the few who grow for the open market most all depend upon the company with which they contract to supply seed, information, and labor. And the companies are now supplying the machines for any mechanical harvesting, except for a very few growers who have obtained them, less than ten among probably eight hundred to a thousand growers

in the state. Many growers supply housing on their farms for workers, and in addition most companies maintain housing facilities.

The areas of production within the state presently are undergoing slight change. Growers have long grown throughout certain areas of the state but in the last decade have been concentrated in two major areas, the Saginaw-Bay City area, and the Montcalm county area. More recently, greater amounts of acreage are being grown in the southwestern part of the state. Much of this small shift is probably due to the labor factor. Before, workers were available early from the sugar beet companies whose center was Saginaw. With a scarcer labor supply the sugar beet companies are using less labor. In addition, workers must be employed continually, and this development favors the Berrien area where far more alternative labor-using crops are grown, providing other employment for pickle workers during downtime in pickles.

Another factor influencing acreage location is irrigation. For mechanical harvesting to become profitable consistently higher yields must be attained, which favors larger growers using irrigation systems and more controlled growing methods. In preparation for switching to predominate use of mechanization, whether for the first picking of a field or after two or three hand harvests, processors are "lining up" these types of growers. It has

not been possible to irrigate the east-state area due to large salt deposits under the ground which infect the water.[1] Therefore, the mid and southwestern state areas are expected to emerge as predominant growing areas in the future.

Under contract specifications, processors are committed to receive all pickles produced on the growers' acreage,[2] while the growers obligate themselves to sell all green stock to the one processor. In years of abundant produce supply when contracted acreage is yielding more than enough green stock for processing operations, this may be reflected to growers as loads rejected due to poor quality,[3] or workers being assigned later than usual, or various other stalling tactics. A short produce year,

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[1]The thumb area of the state also contained numerous pickle growers in the past, but that number seems to be declining. This land has been less desirable because it cannot be tiled due to a legal injunction, resulting from potential flooding dangers in the Saginaw area.

[2]More specific contract provisions can cover such points as: delivery schedules, delivery limitations, closing date for delivery, containers, charges for lost or damaged containers, passed acreage, rejection of product or acreage, cancellation of the contract, and others. These provisions were lifted from an unpublished paper by Noel Stuckman, "A Look at the Michigan Pickle Industry." Some current contracts are offering per acre guarantees, ranging around $100 per acre, generally as enticement to obtain growers who are fearful of loss, often stemming from fear of the inefficiency of mechanical harvesting.

[3]The summer of 1967 was such a summer early in the Michigan harvesting season, because supplies from southern contracted acreage were quite large. Outside observers saw loads of pickles sitting on the docks of

on the other hand, would find processors paying growers for larger pickles (nubs)normally rejected, and could find growers "jumping" contract provisions to sell part of the acreage to buyers on the open market offering prices much higher than those under contracts.[1]

The out-of-pocket cost to the grower in pickle production can be relatively small on a per acre basis, because the company handles the large cost factor, labor. Planting and fertilizer application can be done with a regular corn planter; the amount of fertilizer application is variable and increases costs. The application of weed and insect chemicals can become more or less costly depending on the type of applicator, whether small band sprayer at planting time, or blast or airplane control later. And the use of an irrigation system can run fixed costs up quite high unless acreage is large or other crops are also irrigated; the main cost is the pump which must be purchased regardless of the feet of pipe used.

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processors for two and three days waiting to be run. Since the value of a load is determined once the green stock is run through the graders, it is little wonder that quality suffered.

[1]Prior to the period when processors supplied the labor, jumping contracts was more easily accomplished; a grower would report that his field which earlier promised a large yield simply failed to yield that much, when in reality the good yield resulted but parts of it were sold off the contract. When the companies began supplying labor on a large scale, their control of the harvest became tighter and grower violation of the contract became more difficult.

The final link in the chain is the worker. The seasonal labor force in pickles is comprised largely of migrant workers from the South, primarily Mexican-Americans from Texas, and a few local workers. In February and March of each year recruiters from the pickle companies, as well as a few farmers, go into the labor supply states of the South and make arrangements with groups of workers to provide work.[1] Often money is advanced to the workers to facilitate transportation as well as pay-off debts collected during slow winter months. Some worker groups have worked earlier years for selected companies and growers, and either a letter of phone call is sufficient to make arrangements, followed of course by a money order as an advancement.

Workers are provided housing when they arrive but not always work if the crops are not ready. Throughout the picking season work is regular except for wet days, sometimes "over-regular" with weekend work when the crops will not wait.

Payment forms have changed considerably within the recent history of the industry. From the simple 50-50

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[1]This is administered almost entirely within the auspices of the Farm Labor Service. Working outside the FLS, the recruiter faces expensive recruiting licenses in supply states. The only entire Michigan industry known to the author, which works outside of the FLS, is the sugar beet industry. Separate growers contact workers in the South via calling, writing, or visiting, but not on an industry basis.

pay system which had a built-in incentive to harvest small pickles, the method has switched almost entirely to either an hourly rate or a piece rate. An hourly rate is almost mandatory with the use of picking aids, since all pickles go into a community box. An hourly system for straight picking work does not encourage hustle. The piece rate system discourages the picking of smaller fruit and thus is somewhat dangerous. Experamentation still exists. The adoption of the mechanical harvester, if and when it comes, will spell the eventual solution of this problem.

APPENDIX II

DATA SOURCES

APPENDIX II

DATA SOURCES

In addition to the numerous reports of studies dealing with this labor market three basic sources of information were used in the research: (1) interviews with individuals familiar with the agricultural labor market; (2) questionnaire mailed to pickle growers; (3) data collected by others.

Interviews

Interviews provided the main source of subjective data. They were held with: growers of various crops; pickle processing personnel, including owners, managers, fieldmen, and green stock buyers; state director and regional directors of the Michigan Farm Labor Service; county Agricultural Extension agents; Michigan State University personnel in agricultural economics, horticulture and food science; Washington staff of the Office of Farm Labor Services; members of the Michigan Farm Bureau.

All interviews were open-ended to gain as much information as possible. Basic interview forms were

developed for each set of similar interviews, for example all regional directors of the Farm Labor Service; however earlier interviews from one set were used to develop additional questions for later interviews. The estimated average length of all interviews was about one and a half to two hours. Extensive notes were taken during the interviews which were typed-out in extended form immediately following.

Random selection of individuals to be interviewed was not attempted. For interviews with all groups except two, growers and pickle processors, the relevant populations were so small that nearly all members were contacted. Among regional Farm Labor Service directors, four of the seven lower peninsula directors were contacted, including the ones in areas of bracero use: Benton Harbor, Muskegon, Saginaw, Lansing. Likewise, county Agricultural Extension agents were contacted in most of the counties in which braceros were used: Allegan, Bay, Montcalm, Sanilac, and Van Buren. In the Washington office of the Farm Labor Service the two individuals most closely associated with the Michigan bracero program on a full-time basis were contacted: the present and former chiefs of the Division of Research and Wage Activities. The individuals contacted at Michigan State University and the Michigan Farm Bureau were intimately connected with either the agricultural labor market or selected crops, primarily pickles.

For the cases of growers and pickle processors, more expedient reasons limited random sampling. The questionnaire was sent to a majority of pickle growers in the state, thus providing a more representative account of information for this crop. Beyond this the time and money budgeted for the thesis would not allow controlled interviews. Thus a small number of growers of other crops were interviewed without any attempt at control other than that the growers be employers of seasonal labor. Of the seven growers contacted three were relatively large employers, two about medium and two were relatively small employers. These interviews were conducted in the Lansing area.

Roughly about forty processors and/or green stock buyers operate in the state; a few of these have processing facilities in other states. About eight of these are large processing companies, and they also were the largest employers of braceros. Original designs were to contact a randomly selected sample of all processors, being sure to get adequate representation of the eight largest. The pickle processing industry was found not to be very open to an outside interviewer and some initial attempts at arranging interviews fell through. Consequently, it was decided to contact as many processors as time would allow, seeing whomever was willing to talk. Representatives of three of the eight largest were

contacted and a telephone conversation was carried on with a fourth. In all, six different processors and/or green stock buyers were contacted.

Questionnaire

In order to obtain selected information on the pickle industry, a questionnaire was designed and mailed to pickle growers in the state. The information desired dealt with such factors as wages, employment, type of workers employed, production practices used, the extent of mechanically harvested acreage, and costs and returns.[1] A copy of the questionnaire follows this appendix as Figure 19.

Before sending the questionnaire it was field tested and modified. Three pickle growers were interviewed with the questionnaire as a base. One grew over a hundred acres, the other two less than fifty. On the basis of their comments the questions were rephrased and modified.

The biggest problem involved obtaining names and addresses of pickle growers.[2] A list of over 800 names

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[1]Most of the information desired would be available from processors since they keep all records on the growers who grow for them. The author was advised however not to expect good cooperation from processors in this regard, and initial contact with them bore out this warning.

[2]Processors have most of these names, as mentioned, but little success was found in getting their lists. Farm Labor Service officials have fairly complete lists but by law are prevented from releasing them. The Michigan

was obtained from a former student of the industry. This list was sent to individuals around the state who agreed to check-off growers still active and add those they knew who were not on the list. Names of over 700 growers were obtained in this manner to whom questionnaires were sent. A small number of these were returned telling of deceased growers, or some who had not grown in years, so the 700 names were not all reliable.

The last four agricultural censuses listed the number of pickle and cucumber growers for the state as: 9,909 growers in 1950; 6,050 in 1954; 3,139 in 1959; 2,011 in 1964.[1] If this trend were projected to 1967 then approximately 1,000 to 1,500 growers would have existed in the state; most of these would be pickle growers. If anything the trend would turn downwards after 1964, for at least two reasons: the cost of pickle production rose, and a concentration of larger acreage on fewer farms began in preparation for mechanical harvesting. Consequently, a reasonable estimate would suggest 1,000 growers in 1967 and probably 600 of these received questionnaires.

The questionnaires were sent out with a cover letter and a self-addressed, stamped, return envelope enclosed. The initial mailing was the first week of

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Department of Health has a list of most migrant camps, but their list excludes growers without camps.

[1]Taken from tables in the U.S. Census of Agriculture, Michigan, 1950, 1954, 1959 and 1964, compiled by the Bureau of the Census.

December, 1967, calculated to be after all crops were in and when plenty of free time was available. A second mailing went out midway through January to the non-respondents, with a second cover letter enclosed. In February a small number of the remaining non-respondents were contacted by telephone. This resulted in some additional response. Generally, however, those failing to respond who were contacted had a reason for it which a telephone conversation could not shake, for example "the company would not want me to do it."

The composite of these efforts resulted in 135 usable questionnaires, which comprised the following total acreages and percentages of the total Michigan acreages when compared with U.S. Department of Agriculture estimates.

TABLE 18.--Questionnaire planted and harvested acreages and the percentages these comprise of the state amounts, 1964-67.

Measure	1964	1965	1966	1967
Questionnaire planted acreage	3,384	2,601	3,440	5,053
% of state USDA amount	13.7%	14.8%	16.5%	17.2%
Questionnaire harvested acreage	3,310	2,434	3,371	4,798
% of state USDA amount	14.4%	14.9%	17.2%	19.0%

As the table indicates about 20 per cent of the 1967 harvested acreage was included in the respondents to the questionnaire. The general indication, both from the questionnaire responses and follow-up phone calls, was that larger growers had a greater tendency to respond than smaller growers. In Table 19 the mean bushel yield per acre for each year of the questionnaire is reported, with its standard deviation, and these are compared to the U.S. Department of Agriculture figures for average yield per acre.[1]

TABLE 19.--Questionnaire yield per acre, with standard deviations, compared with USDA figures, 1964-67.

Measure	1964	1965	1966	1967
Question. yield/acre	287	261	304	238
Standard deviation	120	112	127	115
USDA yield/acre	202	228	249	186

[1]The yield per acre question was one of the more infrequently completed, thus giving rise to such large standard deviations. Quite often growers did not have this information ("the company's business"). One might expect the larger, more scientific growers to be concerned with their yield and thus to have this information available, putting an upward bias in the data, since these same growers tend to have higher yields.

As is seen the questionnaire mean yields all range above the comparable USDA figures, though not significantly so at any crucial confidence level. The uniformly upward tendency could indicate that larger growers, who characteristically have larger yields per acre, tended to respond better than smaller growers. If anything, therefore, the over-all questionnaire response may show a larger percentage of the bigger growers than exists in the population, and must be interpreted in light of this possibility.

The quality of responses varied greatly. Several questions were completed on nearly all of the usable questionnaires, notably those asking for acreages, wages, irrigation and weed control, and mechanically harvested acreage. Employment figures often were not supplied, the grower simply "checking" the types of workers employed. Responses to yield per acre and productivity of workers were sketchy, and responses to dollar returns per acre and costs per acre proved very disappointing; many growers simply did not know this information. On the other hand a number of growers wrote comments on the questionnaires which provided additional information as well as some "color."

Data Collected by Others

Three primary sources supplied data for use in the thesis: (1) U.S. Department of Agriculture, Statistical Reporting Service, in the monthly publication Farm Labor; (2) U.S. Department of Agriculture, Economic Research Service, in an annual publication The Hired Farm Working Force; (3) Michigan Farm Labor Service in the annual Michigan Farm Labor Report: Post Season.

Data in Farm Labor are obtained from a questionnaire mailed monthly to growers throughout each state. The form requests information on all workers employed in farm work during the survey week, the last full week of each month. Family members other than the operator are reported as such if they work 15 hours or more without receiving cash wages, including family members not falling in the above class; operators are reported separately. In Michigan, over 2,000 questionnaires are sent out and roughly 600-700 are returned. The names of growers receiving questionnaires are taken from a list maintained by the state office of the Crop Reporting Service, made up largely of names supplied by the county extension agents. The list is reported to contain a weak representation of employers of seasonal labor.

The publication, The Hired Farm Working Force, reports information on hired workers in agriculture on national and regional bases. The data are obtained from

a special supplement attached to the December edition of the monthly population survey conducted by the Bureau of the Census, using their sample. A question is asked whether any farm work was done during the year, and a "yes" answer triggers further questions. A basic limitation of this source for Michigan is that information is reported for the area of the country in which the workers dwell, rather than where they work, so there is no way to filter out southern workers who worked in Michigan from those working in other states.

Information in the Michigan Farm Labor Report: Post Season comes from estimates made by local officials of the Farm Labor Service for "seasonally hired" workers only. Two reports submitted internally within the FLS provide the basic information for the publication. One report, ES-223, is completed monthly by regional supervisors within the state giving information about the employment of seasonal workers on the 15th of the month.[1] The second report, ES-232, is specially requested from the Farm Labor Service in Washington and completed by local officials as directed throughout the season. Both reports are estimates by local officials based upon observations of and talks with workers and growers in the field.

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[1]In 1967 one report per month was forwarded to state and national offices. Prior to 1967 two reports per month were forwarded, one on the 15th and one on the 30th.

Wages

All three reports provide data on wage rates. Farm Labor reports wages quarterly based on the last week's experience in January, April, July, and October. The data are reported in terms of monthly, weekly, daily, and hourly amounts, with and without board and room, and a composite hourly rate formulated. The relevant measure for the present study is wage rates per hour without board and room, since this is the best approximation of the major payment method used for seasonally employed workers. Unfortunately wages per hour with room is not reported for Michigan and this measure would be a truer approximation than the former one. Piece rate methods are converted to hourly rates by having the reporting growers estimate the hourly equivalent. This obviously leads to some bias, probably an upward one, since growers would tend to overstate their workers' earnings.

These wage data are considered the most reliable for the purposes of this study. They are averages of seasonal and non-seasonal hired workers and thus probably have some upward bias in wage level in terms of seasonal workers alone, since non-seasonal hired workers generally are paid slightly more on an hourly basis. Many non-seasonal workers are taken out of the hourly wage figures, however, since they often are paid weekly and monthly. If there is any bias to these data it is considered a consistent one, and thus loses some of its impact over time.

The Hired Farm Working Force reports wages earned per day and per year for workers employed at any time in farm work. The figures are reported as total wages earned for farm and non-farm work and separately for each source of work. The figures are further broken down in numerous ways, the important ones for this study being all farm workers, all migrants, and region of the nation in which workers dwell. For applicability to Michigan the breakdown at the North Central region level would include local workers and intrastate migrants. The southern region would contain many Michigan interstate migrants, but also migrants to other states in the whole northern and central parts of the nation.

These data are collected on a household basis rather than the establishment basis of Farm Labor and hence are probably slightly more accurate, though far less flexible on a statewide basis. The main reliability problem is the difficulty in obtaining accurate yearly and daily income data from workers whose records surely are poor.

The data in Michigan Farm Labor Report are reported in both hourly and piece rate amounts, and there is no consistent attempt to arrive at average hourly equivalents. Whereas Farm Labor reports one statewide wage figure, the Farm Labor Service reports wage data for many crops and activities as well as for different regions within the state. The piece rate data undoubtedly are highly reliable,

since wage rates can be obtained by asking, and regional supervisors cover large portions of their respective territories. Whether the rates were those being paid on the 15th is questionable, but this is relatively unimportant.

At times average hourly equivalents are reported, based on the ES-232 reports. These figures are questionable however, since in obtaining them no effort is made to assure a random sampling of workers or picking conditions. As many workers as possible are contacted and average hourly amounts estimated from talks with workers and growers. At a given point in time these average hourly equivalents for a crop or area are probably as reliable as those reported in Farm Labor, but there would be far less consistency over time and thus a random bias would be introduced making comparisons difficult.[1]

Employment

Again, all three basic sources supply employment data. Farm Labor provides the best estimates for the purpose of this thesis. Employment data are reported monthly on all hired and family laborers, and from this the state amount

[1]There is no real way to estimate a consistent bias in these figures. One regional supervisor may favor grower interests and tend to accept higher estimates; a second may be skeptical of growers and tend to accept a lower estimate. If there is any political vying among regions then particular supervisors could want their region to look better than others.

is calculated to the nearest thousand. In that all hired workers are included seasonal workers are mixed with non-seasonal.

There appear to be two major problems with these data: (1) double-counting and (2) non-representativeness of seasonal employers. Any workers transferred from one farm to another during the survey week would be picked up twice by the questionnaire. As a result there is an upward bias. Working in an opposite direction is another bias. In the heat and activity of the summer there would be a greater likelihood that larger employers would fail to respond than smaller ones. For these employers, filling out the questionnaire would take more time and be more difficult due to the various crops and activities involved. As noted, this would bias the data downward, thus off-setting the first bias some. The upward bias would be strengthened due to the fact that the lists of names from which the sample is taken probably is skewed towards larger growers. County agents are more likely to supply names of the larger, better known growers. In addition, collection officials admit they "go after" the big growers. Again, any biases in these data should be mitigated somewhat over time because of consistency.

Employment data from The Hired Farm Working Force again are more reliable, but on a scale too wide for applicability to Michigan.

Employment data are collected in the ES-223 reports for the Michigan Farm Labor Report, but the quality of the data are questionable. Using various past indications regional supervisors estimate their area's seasonal employment for a given day. An upward bias is considered a part of these data for various reasons. Officials generally visit the larger farms and would therefore assume other growers employ similar amounts. A given official's "professional prestige" derives from his ability to coordinate many workers well, and thus there is a natural inclination to over-state employment figures: the job depends on it. Double-counting is also a danger as supervisors cannot visit all growers in their region on a given day and thus may see the same workers more than once during visits over time. Unlike the Farm Labor data, there does not seem to be a counter-biasing factor in the downward direction. As with the average hourly wage data from this source, the bias in these figures would not be consistent. An advantage of the Farm Labor Service estimates is that they are reported regionally within the state on the ES-223 forms.[1] Table 20 lists monthly employment data from both sources for 1966 and 1967. As can be seen, the USDA estimates show far less intensity of change in either direction.

[1]In the research each of the regional ES-223 reports from 1963 through 1967 were reviewed, as well as the ES-232 reports for the same period. In addition to the wage and employment information is information concerning weather conditions and other matter like employment practices, use of mechanical equipment, etc.

TABLE 20.--Seasonal farm employment estimates for Michigan agriculture, taken from FLS and USDA sources, 1966-67.

Month	1966		1967	
	FLS*	USDA**	FLS*	USDA**
May	18,994	27,000	16,045	30,000
June	51,098	42,000	54,005	35,000
July	67,635	54,000	70,439	46,000
August	51,230	45,000	53,060	44,000
September	28,567	34,000	33,647	33,000
October	11,188	30,000	13,048	32,000

*Figures are for the 30th of each month.

**Figures are taken from the last week of each month.

Over time the seasonal employment data collected by the Farm Labor Service probably are inflated, while the Farm Labor data probably under-state the amount of seasonal labor. The latter data however are considered more consistently reliable and are used in the quantitative analysis. The actual employment figures used are averages of the May to October monthly employment. The average is used rather than a peak employment figure to control for seasonal weather changes which could affect peak employment strangely.

Grower Questionnaire
Pickling Cucumbers

1. What is your name? _____
2. What is the county in which your pickling cucumbers are grown?
   _____
3. What has been the total acreage for all crops that you have farmed (owned, rented or leased) in each of the last four years (do not include idle land)?
   a. 1967 _____ c. 1965 _____
   b. 1966 _____ d. 1964 _____
4. What is the primary crop, or activity, of your farm operations?
   _____
5. With which company have you contracted to grow pickles in each of the last four years?
   a. 1967 _____ c. 1965 _____
   b. 1966 _____ d. 1964 _____
6. To what receiving station did you deliver your pickles this year?
   _____
7. How many acres of pickles have you <u>planted</u> in each of the last four years?
   a. 1967 _____ c. 1965 _____
   b. 1966 _____ d. 1964 _____
8. How many acres of pickles have you <u>harvested</u> in each of the last four years?
   a. 1967 _____ c. 1965 _____
   b. 1966 _____ d. 1964 _____
9. What type of workers did you use for <u>hoeing</u> in each of the last four years (check the type of worker <u>and</u> give the number of that type you employed)?

	1967	1966	1965	1964
a. local workers.....				
b. workers from other areas in Mich..				
c. family workers from other states..				
d. stag workers from other states....				
e. grower's family.....				
f. foreign workers.....				

10. What type of workers have you used for <u>harvesting</u> in each of the last four years (check the type and give the number of that type you employed)?

	1967	1966	1965	1964
a. local workers.....				
b. workers from other areas in Mich..				
c. family workers from other states..				
d. stag workers from other states....				
e. grower's family.....				
f. foreign workers.....				

11. How have you obtained your labor for each of the last four years (check the method used <u>and</u> give the number obtained by each method)?

	1967	1966	1965	1964
a. recruited local workers yourself..				
b. recruited migrants yourself by traveling outside your area.....				
c. recruited migrants yourself by calling or writing letters.....				
d. company recruited them for you....				
e. other (explain) _____				

12. Answer the following questions yes or no - add further comments if you wish.
   a. within the last <u>three</u> years have you had to give workers a greater guarantee of constant work before they will work for you.....___
   b. once workers are with you, have you had to provide more work (on your farm or others) to make them stay with you.....___
   c. has there been a higher turnover of workers on your farm within the last three years.....___
   d. have you had to improve worker housing better than state regulations require to get enough workers within the last three years.....___
   e. other (explain) _____ ___

13. What type of wage agreement have you used with your workers doing hoeing in each of the last four years (check the type of agreement used and give the wage rate paid)?

	1967	1966	1965	1964
a. hourly wage.....				
b. per acre wage....				
c. per cent of crop.				
d. other (explain) _____				

14. What type of wage agreement have you used with your workers doing harvesting in each of the last four years (check the type and give the wage rate paid)?

	1967	1966	1965	1964
a. hourly wage.....				
b. piece rate.....				
c. per cent of crop.				
d. other (explain) _____				

15. What additional benefits have you supplied your workers for each of the last four years (check the type)?

	1967	1966	1965	1964
a. housing.....				
b. transportation money to Mich.....				
c. transportation money from Mich.....				
d. loans (credit).....				
e. insurance.....				
f. other (explain) _____				
_____				

16. How many acres could your average harvesting worker handle in each of the last four years?

a. 1967 _____ c. 1965 _____
b. 1966 _____ d. 1964 _____

17. How many workers have you employed for harvesting, in an average harvest week, for each of the last four years?

a. 1967 _____ c. 1965 _____
b. 1966 _____ d. 1964 _____

18. Designate whether you have irrigated your pickles for any of the last four years, and give the size of the rig by feet of pipe.

a. 1967 _____ c. 1965 _____
b. 1966 _____ d. 1964 _____

19. What plant population per acre (or row spacing and plant spacing within the row) have you used for each of the last four years?

a. 1967 _____ c. 1965 _____
b. 1966 _____ d. 1964 _____

20. What was your total fertilizer application for each of the last four years in terms of formula and amount per acre, for all types of applications (pre-planting, planting, post-planting)?

a. 1967 _____
b. 1966 _____
c. 1965 _____
d. 1964 _____

21. How much chemical weed control have you used for each of the last four years in terms of amount per acre, for all methods of application?

a. 1967 _____
b. 1966 _____
c. 1965 _____
d. 1964 _____

22. How have you applied weed control chemical for each of the last four years?

	1967	1966	1965	1964
a. blast sprayer.....				
b. boom sprayer.....				
c. airplane.....				
d. other (explain) _____				

23. Answer the following questions if you did machine harvesting in any of the last three years.
    a. how much of your acreage was machine harvested in each of the last three years (regardless of the number of pre-harvests by hand)
        1967 _____
        1966 _____
        1965 _____
    b. who owned the harvester in each year (self, company, custom)
        1967 _____
        1966 _____
        1965 _____
24. What was your yield per acre in terms of bushels (or however else it was measured) for each of the last four years?
    a. 1967 _____ c. 1965 _____
    b. 1966 _____ d. 1964 _____
25. What was the dollar return per acre to you on your pickles for each of the last four years?
    a. 1967 _____ c. 1965 _____
    b. 1966 _____ d. 1964 _____
26. What percentage of the value of the crop has the company paid you in each of the last four years?
    a. 1967 _____ c. 1965 _____
    b. 1966 _____ d. 1964 _____
27. What services has the company provided you in each of the last four years (check the service)?

	1967	1966	1965	1964
a. provided the seed.....				
b. provided irrigation.....				
c. provided field containers.....				
d. provided harvesting aids.....				
e. provided credit.....				
f. provided trucking.....				
g. provided housing for workers..				
h. provided a personal field man.				
i. other (explain) _____.				
_____.				

28. What has been the per acre cost to you of growing and harvesting pickles for each of the last four years?
    a. 1967 _____ c. 1965 _____
    b. 1966 _____ d. 1964 _____

APPENDIX III

DETERMINANTS OF THE WAGE CHANGE

APPENDIX III

DETERMINANTS OF THE WAGE CHANGE

Factors Affecting Wages

It has been seen that a statistically significant shift occurred in wages paid all Michigan hired agricultural workers following 1964. The question arises as to what factors were operating during the period subsequent to 1964 to cause the shift in wages. It is important to know how much of the change in wages can be tied to the termination of bracero use. If, for example, the employment reduction accounted for very little of the change in wages, this would lead to differing policy suggestions than if the employment reduction accounted for a large part of the wage change.

In the analysis of Chapter IV a fairly strong case was made for the effect of bracero employment on wages. When braceros were removed wages improved significantly, both in 1965 and 1966. In this appendix a statistical estimate of the various factors affecting wages has been made. As will be seen, however, there is such a great deal of error present, both in the estimations of all the variables and from intercorrelation among the independent variables, that the

estimate is quite unsatisfactory. Nevertheless, for whatever light may be shed, the estimate is presented.

The measure of wages for this analysis is the hourly wage rate without board or room paid hired workers in Michigan, as reported by the U.S. Department of Agriculture. The annual average of the July and October reports is the figure used. This measure aggregates across all crops and thus picks up forces acting on crops other than those most closely associated with braceros. This creates some error, though it is not considered great.

A number of factors were actively affecting wages of Michigan agricultural workers during this period, but those considered most important are the following: (1) the termination in the employment of braceros; (2) the increase in opportunity costs in non-farm employments; (3) the change in output of agricultural products using seasonal labor; (4) the change in manhour productivity among seasonal workers; (5) the change in the costs of non-labor inputs to growers.

The presence of braceros should have exercised an inverse effect upon wages, keeping supplies of labor greater than would otherwise have existed and thus maintaining lower wage rates. A considerable problem arises in measuring bracero employment in a correct way. Absolute bracero employment would not suffice since

foreign employment relative to domestic (or total) employment would be the needed measure. But relative to what total employment figures should bracero employment be considered: total pickle employment or total seasonal employment? This should be answered according to whether bracero employment affected only pickles or all crops. More precisely, their presence probably affected both, but pickles more, so a weighting problem arises. Beyond this, the employment measure probably should be stated as manhours of work, however data are only available on peak employment in numbers of workers, and then only for one day (or week) during each month. The specification problems are indeed great. The measure which will be used is peak employment of braceros (measured always on August 15th) as a per cent of average May-October peak employment of all workers (measured in the last week of each month).[1]

An alternative measure might have been peak bracero employment as a per cent of peak August employment of all workers, but the presence of braceros affected employment in months other than August; the alternative to bracero employment certainly affected the July and September markets, and perhaps others. Selecting the above measure does not answer the weighting problem nor the manhour

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[1]The data for each of the factors used in the analysis are summarized in Table 21, found following the discussion of all the factors.

problem, but any attempt to adjust for these could lead to an even greater error since no realistic conversion factors can be estimated.

Increasing opportunity costs to farm employment should exercise a direct effect upon wages, pulling workers out of farm work and thus exerting an upward pressure on wages. A stepped-up draft call, for example, would exercise such an effect, as would expanding programs to retrain unemployed and underemployed workers--at least in the short run. The most powerful force enhancing non-farm opportunities undoubtedly was a growing economy which absorbed farm workers into steadier and higher-paying jobs. As with the previous variable there is no single good measure of these opportunity costs. Probably the most suitable indication of non-farm opportunities is U.S. unemployment, though this figure includes areas of the country which would not be considered alternatives to farm workers in Michigan. It is probable that non-farm opportunities were increasing during the period of adjustment to braceros, perhaps at a higher rate than any time since World War II, due to the lengthening general economic expansion begun in the early 1960's.

The third factor, changing output of agricultural products which employ seasonal labor, should exert a positive effect upon wages. Higher output levels, ceteris paribus, require more workers and a larger demand and thus

higher wages. What is needed then is an index of farm output among crops using seasonal labor. Such an index was constructed for those Michigan crops using large numbers of seasonal labor.[1] The index was based on annual production figures for the following crops: sugar beets, potatoes, asparagus, strawberries, apples, peaches, pears, cherries, grapes, cucumbers, lettuce and tomatoes.

The change in manhour productivity among migrant workers could have several impacts upon wages of farm labor. In most labor markets an increase in productivity is positively related with wages, and this would be the expected impact in agriculture. But since seasonal farm employment constitutes the lowest rung of the labor force, workers displaced by productivity advances in one crop flow into other crops serving to dampen wage increases there. Therefore, unless an index selective enough to discern productivity changes in each crop is available, specification of this factor may be difficult.

A 1964 study of productivity increases in fresh market vegetables found a 94 per cent increase in output per manhour from 1939 to 1959 for all crops studied, or 4.70 per cent per year.[2] In the study, the rates of

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[1]These figures were obtained in Michigan Agricultural Statistics, published annually by the Michigan Department of Agriculture (Lansing, Michigan).

[2]See Earl Gavitt, "Labor Used to Produce Vegetables: Estimates by States, 1959,: Statistical Bulletin No. 341, USDA, Economic Research Service, Farm Production Economics Division (Washington, D.C.: Government Printing Office, March, 1964).

increase during this period for three crops which are now grown in Michigan were: asparagus, 8 per cent (.4% each year); cucumbers (fresh market, 58 per cent (2.9% each year); tomatoes, 57 per cent (2.85% each year). The U.S. Department of Agriculture reports the change in manhour productivity at the national level for all crops.[1] The rate of increase for this index between 1950 and 1967 was 6.18 per cent each year. Undoubtedly the rate of increase in crops using seasonal labor was less than this, and perhaps less than the 4.70 per cent figure for the 1939 to 1959 period, as the lower figures for the three selected crops indicate. To construct an index applicable to Michigan for the migrant crops would require manhour information which is not available. The only recourse appears to be reliance upon the figures for all crops at the national level. Though the level of this measure is high the changes in it may not be too different from changes in a more appropriate, but unavailable index. Obviously there is considerable error encountered here.

The final factor, the change in the costs of non-labor inputs to growers, exercises an uncertain effect upon wages. Non-labor inputs can be either substitutes for, complements of, or unrelated to the labor factor

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[1]See USDA, Economic Research Service, The Farm Cost Situation (Washington: Government Printing Office, November, 1967), 11.

in the production function. Increases in the costs of substitute inputs would, ceteris paribus, lead to the substitution of labor for these inputs, an increased demand for labor and thus higher wages: a positive relationship. On the other hand an increase in the costs of complementary inputs, or unrelated inputs, would put a downward pressure on wages; in this case there is no substitute effect between labor and these inputs, but there is a contraction (income) effect,[1] which means the grower has less income than before the cost increase and thus he employs less of all factors, including labor. The particular effect upon wages would depend on whether non-labor inputs were substitutes or not. A possible case is that for the crops under consideration the contraction effect would dominate precisely because there are not many substitutes for seasonal labor.

An indication of the costs to growers of non-labor inputs can be gained from indices of costs to all farmers in the U.S. as compiled by the U.S. Department of Agriculture in The Farm Cost Situation.[2] Of the various inputs for which indices are given, several appear to reflect costs to seasonal employers more closely: farm

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[1]See Milton Friedman, Price Theory: A Provisional Text (Aldine Publishing Co., 1962), 179.

[2]USDA, Economic Research Service, The Farm Cost Situation (Washington: Government Printing Office, November, 1967), 2.

machinery, farm supplies, fertilizers, and seed. Other indices on such items as feed, livestock, and motor vehicles were not considered as relevant. As with several previous variables the estimation of this one is not good, for it includes all farmers in the U.S. rather than Michigan seasonal employers.

Analysis

The five independent variables were regressed on wage rates for the 1951-1966 period, and the following multiple regression obtained:

$$X_0 = +1.532 - 0.0009X_1 - 0.0126X_2 - 0.0987X_3 + 0.0043X_4 - 0.0068X_5,^{1}$$
$$(-0.854)\ (-0.166)\ (-1.463)\ (+5.967)^{*}\ (-1.565)$$

where: X_0 = July-October average wages of all hired agricultural workers in Michigan;

X_1 = peak bracero employment as a per cent of May-October average employment of all Michigan farm workers;

X_2 = average yearly U.S. unemployment rate of all workers;

X_3 = output index of those Michigan crops using large numbers of migrant workers;

X_4 = productivity index of all agricultural workers in the U.S.;

X_5 = cost index of non-labor inputs for all U.S. farms.

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[1] The regression coefficients are given with their respective t-values shown in parentheses below. An asterisk (*) indicates a level of significance of .05 or less.

TABLE 21.--Measures of the variables used in the regression analysis of five independent variables on wages, in Michigan agriculture, 1951-1966.

Year	Wage[a]	Bracero Employmt.[b] (%)	Output[c] (1953-55=100)	Productivity[d] (1957-59=100)	U.S. un-employmt.[e]	Cost[f] (1957-59=100)
1951	$0.930	3.23%	.979	62	3.3	98.5
1952	0.975	6.74	.892	68	3.1	105.0
1953	1.010	14.24	.964	71	2.9	102.0
1954	1.005	10.16	.996	74	5.6	99.0
1955	1.025	13.88	1.040	80	4.4	100.0
1956	1.055	19.80	1.096	86	4.2	97.5
1957	1.065	24.28	1.186	91	4.3	100.0
1958	1.055	16.04	1.403	103	6.8	100.0
1959	1.070	18.18	1.515	106	5.5	100.0
1960	1.070	10.48	1.430	115	5.6	102.0
1961	1.090	24.53	1.756	120	6.7	103.0
1962	1.105	23.01	1.441	127	5.6	104.0
1963	1.120	22.88	1.382	135	5.7	106.0
1964	1.135	24.24	1.696	142	5.2	107.0
1965	1.205	000	1.726	155	4.6	109.0
1966	1.320	000	1.433	161	3.8	109.0

[a]Average July and October hourly wage rate without room and board for all hired workers in Michigan--reported by the USDA in Farm Labor.

[b]Peak bracero employment as a percentage of average May-October employment of all hired workers in Michigan, as reported by the USDA in Farm Labor.

[c]Annual production index of Michigan crops using seasonal labor.

[d]Change in manhour productivity for all crops at the national level--reported by the USDA in The Farm Cost Situation.

[e]Average annual U.S. unemployment rate of all workers.

[f]Cost index of selected non-labor inputs--reported by the USDA in The Farm Cost Situation.

The multiple correlation coefficient for the total regression was .9648, and the F-value for the regression was 26.898 (significant at .01 level). The high correlation coefficient indicates a good degree of correlation between the independent variables and the dependent variable, which can suggest causation. But the low t-values of most of the regression coefficients suggest that intercorrelation is present between the independent variables as well, thus impairing the ability of the regression to give true estimates of the causative impacts of the independent variables on wages. The partial correlation coefficients of the independent variables, indicating the variance in the dependent variable correlated with the given independent variable, while holding all other variables constant, are presented in Table 22.

TABLE 22.--The partial correlation coefficients of the variables displayed in the multiple regression.

	X_1	X_2	X_3	X_4	X_5
Partial correlation coefficient	-0.2608	-0.4199	+0.8836	-0.3459	-0.4435

Due to the hypothesized poorer state of the productivity specification, this variable was removed and a second multiple regression equation estimated:

$$X_0 = -0.2101 - 0.0013\ X_1 - 0.0054\ X_2 + 0.1644 X_3 + 0.0109\ X_5,$$
$$\qquad\qquad (-0.573) \quad (-0.246) \quad (+1.581) \quad (+1.664)$$

where the X's are the same as before. The multiple correlation coefficient for the over-all regression was lower than before at .8273--still relatively high however--and the F-value of the regression dropped to 5.9621 (significant at .01 level).

In the initial regression the signs are as expected, except for the negative correlation with output; the cost correlation is negative, which could be the case if the non-labor inputs were complements of rather than substitutes for labor. However both signs change to positive in the second regression, reinforcing the fact that intercorrelation exists. In neither regression however are the t-values of these variables significant. In fact, the only significant t-value is that for the productivity regression coefficient in the first regression, which could appear strange since the specification of this variable was so weak. About the most that can be inferred from the regression analysis is that several variables other than the employment of Mexican nationals were exerting an effect upon wages during the period under

analysis, but the amount of the effect of the several variables is highly uncertain, except perhaps for the poorly specified variable, productivity.

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