AN ECONOMIC ANALYSIS OF MIGRATION IN OKLAHOMA

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CHAPTER I

INTRODUCTION

The migration of people has exerted an important influence on changes in the size of the population of both Oklahoma and its 77 counties. Inter-state migration resulted in a state population loss of 218,553 persons during the 1950s. The 1960s saw a reversal of this, but the total population gain was only 13,349.[1] However, according to the latest available estimate there were 139,000 net in-migrants into Oklahoma during 1970-1977.[2] At the county level, 57 counties experienced net in-migration between 1970 and 1975, while during the 1960s and 1950s only 33 and 5 counties respectively, had more in- than out-migration.[3]

Population migration within Oklahoma, coupled with inter-state movement has caused a major change in the state's population distribution in the last few decades. The most important force behind the intra-state movement of Oklahomas since 1950 has been the rural to urban migration that has also occurred everywhere else in this country and in other countries. The reason has been a combination of declining economic

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[1] G. M. Lage, R. L. Moomaw, and L. Warner, A Profile of Oklahoma Economic Development 1950-1975 (Oklahoma City, 1977), pp. 27-28.

[2] U. S. Bureau of the Census, Current Population Reports August, 1979, Series P-26, No. 78-36.

[3] G. M. Lage, R. L. Moomaw, and L. Warner, pp. 27-28.

opportunity in agriculture and increasingly attractive opportunities in the urban areas. Thus,

> Both the Oklahoma City and Tulsa Metropolitan Areas grew rapidly during the 1950s and 1960s while the populations of the nonmetropolitan areas declined in absolute numbers or grew very slowly. The Oklahoma City Metropolitan Area's 67.1 percent growth from 1950 to 1975 is 14.5 percentage points above the growth of the Tulsa Metropolitan Area. Estimates of the July 1, 1975 population show almost exactly half of the state's population (49.4 percent) in the 11 counties that make up these two metropolitan areas. This is a substantial increase from the 37.4 percent share in 1950.[4]

The shares of western and eastern nonmetropolitan Oklahoma in 1975 were 22.5 and 28.1 percent respectively, as compared with 27.3 and 35.3 percent in 1950.

However it should be noted that between 1960-1970 and 1970-1974, the farm-to-nonfarm movement seems to have slowed down. For the Oklahoma City and Tulsa Metropolitan Areas, the rate of population growth was only 7.7 percent and 6.7 percent respectively, during 1970-1975 as compared with 23.5 percent and 15.5 percent respectively, during 1960-1970. In western and eastern nonmetropolitan Oklahoma, however, the population grew by 1.5 percent and 7.4 percent respectively during the first half of the 1970s as compared with 0.2 percent and 3.4 percent respectively during the 1960s.[5] Warner also mentions that between the two time periods,

> . . . the dramatic shift from net out- to net in-migration is very much a nonmetropolitan condition. Of the 732 non-SMSA Great Plains counties, 294 shifted from net out- to net in-migration between the 1960s and 1970-1974, while only 36 exhibited the reverse.[6]

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[4]Ibid., p. 27.

[5]Ibid., p. 28.

[6]Larkin Warner, Migration Trends in the Great Plains, 1970-1974 (Oklahoma City, 1975), p. 4.

There is another discernable force in Oklahoma in-migration. Retirees, some of them taking early retirement and returning to their home state, have become a growing segment of the Oklahoma population. Warner states that "the critical point for the Great Plains region relates to the significant number of potential return migrants who left the region in the 1930s through the 1960s."[7] A substantial part of the retired group from both outside and within the state has been attracted to the lakes in eastern Oklahoma. This may partially account for the fact that of the 22 counties that lost population between 1970 and 1975, 17 were in western nonmetropolitan Oklahoma while only 5 were in eastern nonmetropolitan Oklahoma.[8] Table I illustrates the movement of population to the lake counties of eastern Oklahoma.[9] During 1970-1975, of the 45 counties east of I-35, the 22 lake counties experienced net in-migration of 49,000 people, or 9.8 percent of the population, while the 23 non-lake counties had 37,000 net in-migrants, or 9.0 percent of the population. Similarly, of the 30 counties west of I-35, the 4 lake counties had 1,000 net in-migrants, while the 26 non-lake counties had 1,000 net out-migrants, each representing 1 percent of the population. Migration, therefore, has been an important determinant of the size, distribution and composition of the population and labor force, both at the state and county level in Oklahoma.

The Purpose of the Study

Migration--both its absolute size and its selectivity of certain

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[7]Ibid., p. 7.

[8]G. M. Lage, R. L. Moomaw, and L. Warner, p. 9.

[9]Betty Anderson, "Retirees with Style in Oklahoma," Oklahoma Business (May-June, 1978), p. 9.

TABLE I

POPULATION AND MIGRATION TRENDS, LAKE AND NON-LAKE COUNTIES, OKLAHOMA 1950-1975

	East of I-35		West of I-35		Tulsa and Oklahoma Counties	Total State
	Lake	Non-Lake	Lake	Non-Lake		
Number of Counties	22	23	4	26	2	77
Population (000)						
1960	430	580	77	456	786	2,328
1970	496	590	76	470	928	2,559
1975	561	631	78	488	955	2,712
Change in Population (000)						
1960-1970	66	10	-1	14	142	231
1970-1975	65	41	2	18	27	153
Net Migration (000)						
1960-1970	44	-23	-6	-33	34	16
1970-1975	49	37	1	-1	-20	67
Net Migration as a Percent of Population						
1960-1970	10.2	-3.9	-7.8	-7.2	4.3	0.7
1970-1975	9.8	9.0	1.3	-0.2	-2.1	2.6

Source: U. S. Department of Agriculture, Net Migration of the Population 1960-1970, by Age, Sex, and Color, Part 5 (Athens, Georgia: University of Georgia Printing Department); U. S. Bureau of the Census, Current Population Reports, 1971, Series P-25, No. 461 and 1976, Series P-26, No. 75-36.

population groups--has had a great impact on the relative economic development of different regions. Cases have been made for migration and against it. Those arguing against migration have pointed out serious limitations to trying to influence migration as an economic adjustment mechanism. One point made is that out-migration gradually deprives depressed areas of some of the most desirable elements of their labor force--the young, the well-educated, and the skilled. As a consequence, those least motivated to move are left behind. This, combined with the finding that in-migration rates are more sensitive to economic conditions than are out-migration rates, leads this group of economists to conclude that encouraging out-migration has major shortcomings as a policy goal.[10] Those making a case for migration point out that evidence presently available does not indicate recent migration from the rural south has significantly altered the composition of problems in the large northern urban areas. At the same time, rural poverty is not relatively cleaner, nicer, or easier than urban poverty, as sometimes implied and there is evidence that the beneficiaries of programs to develop backward rural areas have not necessarily been the local disadvantaged. Therefore, a policy designed to influence migration is advocated as being effective when combined with other measures.[11]

This study will look at the determinants of migration in Oklahoma during the period 1970-1973, and at the relationship between migration and employment growth. Not enough data were available to analyze all the problems of lagging areas in the context of Oklahoma. However, it

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[10]Eva Mueller and Jane Lean, "The Case Against Migration," New Generation, 50 (Summer, 1968), pp. 7-8.

[11]Bette S. Mahoney, "The Case for Migration," New Generation, 50 (Summer, 1968), pp. 6, 9-10.

is hoped that some policy implications will emerge from the analysis to aid state and local planners in developing some guidelines for the mix of regional policies to implement as a general rule.

This study is based on a new data source that should prove to be very useful for the analysis of migration in the future. The Bureau of Economic Analysis data based on the 10 percent Social Security Continuous Work History Sample are a very valuable and relatively new (dating back only to the early 1970s) source of migration statistics. The use here of these data is considered to be as important as the analytical work based on them.

The BEA data, described in detail in Appendix A, contain information on in-migration to, and out-migration from, each of the 77 counties of Oklahoma. The in-migrants to each county are classified as coming from either the rest of Oklahoma or from each of the other 49 states. Out-migrants are similarly classified as going to either the rest of Oklahoma or to each of the other 49 states. It was found that 45 percent of all in-migrants came from, and 51 percent of all out-migrants went to, the rest of Oklahoma. However, it was also found that 78 percent of all in-migrants came from either the rest of the state or from the six adjoining states (Kansas, Missouri, Arkansas, Texas, New Mexico, and Colorado), while 82 percent of all out-migrants went to either the rest of the state or to the adjoining states.

At the county level, it was found that a much larger percentage of in- and out-migrants to and from counties located at the center of the state came from or went to the rest of the state than for the counties bordering the state. Thus, intra-state in-migration percentages for the central counties of Blaine, Caddo, Creek, Lincoln, Kingfisher, Logan and Canadian were 70, 69, 72, 87, 71, 65, and 63 respectively,

while their intra-state out-migration percentages were 67, 64, 80, 88, 84, 80 and 82 respectively. These compare with intra-state in- and out-migration averages of 45 percent and 51 percent, respectively, for all 77 counties. The migration percentages for all the counties are shown in Table XXI of Appendix A. Therefore, it can be inferred that those migrating between Oklahoma and its adjoining states must have either come from or gone to counties relatively near the border of Oklahoma. The conclusion is that most of the migration to and from the counties of Oklahoma during the period 1971-1973 was relatively short-distance.

The Rationale for Doing the Study

The migration of people has been a much researched phenomenon with economists, demographers, sociologists and geographers all having made contributions to the literature on this subject. The main body of the work had dealt with the intra-national movement of workers in the developed countries. Economists have traditionally concentrated on the causes of migration with little examination of its consequences. As a result, the influence of migration as an equilibrating mechanism in a changing economy and its possible role as a policy instrument in the hands of federal and state planners has been largely ignored. This supplies the reason for doing the present study.

The analysis of migration in Oklahoma should reveal the main determinants of short-distance migration. This should allow one to come to some conclusion about the relative importance of the various economic variables in determining short-distance as opposed to relatively longer distance migration, since the latter is well documented. The simultaneous-equations approach of looking at both the causes and effects of migration should yield some indication of the effectiveness

of policies designed to influence regional development through migration. Should state and local planners try to foster or reverse present patterns of migration?

Organization of the Study

This study consists of six chapters and three appendixes. Chapter I has been the introduction. In this chapter, the reason for attempting the study and its purpose have been discussed.

Chapter II contains a brief reveiw of the conclusions of the literature on migration selectivity. The selectivity of migration in Oklahoma is compared with the findings of other researchers. The effect of the selective movement of workers on the composition of various regions' labor force is studied.

In Chapter III a theoretical model of migration and employment growth is presented.

Chapter IV contains a discussion of the data sources and the regression results.

In Chapter V the regression results of the previous chapter have been analyzed and interpreted.

The last chapter considers the conclusions and the policy implications.

Appendix A contains a detailed discussion of the major source of data used in this study (the BEA data), and its peculiarities.

Appendix B tabulates median age by county for Oklahoma during the period 1950-1970.

Appendix C contains the regression results for two other versions of the theoretical model.

CHAPTER II

THE SELECTIVITY OF MIGRATION

This chapter studies the selective nature of migration. Migration as a rational choice decision can be viewed as a

> . . . relatively permanent moving away of a collectivity called migrants from one geographical location to another, preceded by decision-making on the part of the migrants on the basis of a hierarchically ordered set of values or valued ends and resulting in the interactional system of the migrants.[1]

Since the context within which the migration decision is made varies for each potential migrant, it is of great interest to investigate the influence of various economic and demographic factors upon the decision to migrate. This chapter concerns itself mainly with the demographic variables.

The discussion consists of three parts. The first part is a brief survey of the migration selectivity results of other studies. The second part contains a descriptive analysis of migration selectivity in Oklahoma and compares the results with those of other studies. The third part considers the effect that migration selectivity has had on the composition of different regions' labor force in Oklahoma.

The Theory of Migration Selectivity

Migration selectivity is important in that it causes some of the

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[1] R. Paul Shaw, Migration Theory and Fact--A Review and Bibliography of Current Literature (Philadelphia, 1975), p. 1.

age-sex-race classes to gain and others to lose in any area. Thus migration can be expected to bring about changes in the relative composition of any area's labor force and consequent changes in the availability of different kinds of labor. Studies of migration selectivity have exposed a great deal of uniformity in the composition of migration streams in that some population groups consistently tend to be much more migratory than others.

The personal demographic characteristics that are likely to exert important influences on the individual's decision to migrate are mainly age, race, education, income level, sex and economic occupation. Some of the other characteristics that have been investigated include marital status, family status and home ownership.

The probability that a labor force member will migrate is likely to decrease as his age increases, since older persons have a shorter expected working life over which to realize the advantages of migrating. Thus persons in their late teens, 20s and 30s are more migratory than those over 40 years old. Also, there is a definite selection of migrants in the age group at which retirement commences--usually between the ages of 65-75 years.[2]

It has been further pointed out by Becker that individuals for whom migration is profitable like to move immediately rather than delay their move because to postpone moving involves the loss during early years of returns that are discounted least.[3] Gallaway has argued that job security and family ties are also likely to be more important for

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[2]Ibid.

[3]Gary S. Becker, Human Capital (New York, 1964).

older persons than for younger ones, which further discourages older persons from migrating. He finds that

> . . . an annual earnings differential of about $85 will be sufficient to compensate a worker for the bundle of objective and subjective costs of movement associated with an additional year of age.[4]

In the same vein, Wertheimer finds that far greater returns accrue to those who migrate earliest. If a male migrant moves at age 30 rather than at 20, his return is reduced by more than 50 percent (when the calculations are performed at 20).[5] Bunting, testing labor mobility by number of employers during a certain year, also finds that labor mobility is inversely related to age.[6]

Relatively more educated people have access to employment information and job opportunities that extend over a greater geographic area. Also, the risk and uncertainty of migrating are likely to be less for the better-educated because they are more likely to have a job prior to moving. Based on Bureau of Labor Statistics survey data, Saben's study finds that 61.7 percent of the 1962-1963 intercounty migrants who were professional, technical, and kindred workers either moved to take a job or were involved in a job transfer. In comparison, only 38.2 percent of all other employed migrants moved for such reasons.[7]

Education may also reduce the importance of tradition and family ties, and increase the individual's awareness of other localities. This

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[4]Lowell E. Gallaway, "Age and Labor Mobility Patterns," Southern Economic Journal, 36 (2), October, 1969, pp. 171-180.

[5]Richard F. Wertheimer, III., The Monetary Rewards of Migration Within the U. S. (Washington, D.C., 1970).

[6]Robert L. Bunting, "Labor Mobility: Sex, Race and Age," Review of Economics and Statistics, 42 (2), May, 1960, pp. 229-231.

[7]Samuel Saben, "Geographic Mobility and Employment Status, March 1962-March 1963," Monthly Labor Review, 87 (8), August, 1964, pp. 873-81.

should reduce the psychic costs of migration. Schwartz finds that within a given age group the deterring effects of distance decline substantially with education.[8] A positive correlation between education and the distance moved has been found by other investigators. Suval and Hamilton show that the correlation between education and migration becomes stronger as the distance of migration increases.[9]

Race has been found to have a substantial effect upon the propensity to migrate. Both the determinants and consequences of nonwhite migration differ appreciably from those associated with white migration. It has been found that whites are more responsive to the availability of job opportunities than nonwhites, but nonwhites are more responsive than whites to income opportunities. One of the reasons for the former observation is probably that more highly skilled persons are more likely to have a job when they move, either going to take a new job or because they are involved in a job transfer. Since nonwhite labor force members are concentrated in the lower occupational strata where job transfers are rare and unemployment more common, they are less likely than whites to have a job in hand when they move. Also, Greenwood and Gormely point out that the South has been one of the areas that has experienced the most rapid increase in job opportunities; but because of relatively more

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[8]Abe Schwartz, "Interpreting the Effect of Distance on Migration," Journal of Political Economy, 81 (5), September/October, 1973, pp. pp. 1153-1169.

[9]Elizabeth M. Suval and C. Horace Hamilton, "Some New Evidence on Educational Selectivity in Migration to and from the South," Social Forces, 43 (4), May, 1965, pp. 536-547.

discrimination against nonwhites, they have not been able to get new jobs in the South.[10]

Greenwood finds that nonwhite civilian labor force members are considerably more responsive to high income levels and high income growth than are white civilian labor force members.[11] It has been suggested by Greenwood and by Gallaway, Gilbert, and Smith that low-income persons are likely to be more responsive to a given income differential than high income persons.[12,13] Cebula, Kohn, and Vedder, among others, suggest that the real income aspects of the availability of welfare benefits are likely to be particularly great for low-income persons, and hence for nonwhites.[14] It has been found that states with relatively high per capita welfare benefits attract a larger number of nonwhite in-migrants. There is some proof that the importance of welfare benefits as an explanatory variable in the migration equation has been increasing in recent years, possibly because knowledge of the availability and magnitude of such benefits has become more widespread over time.

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[10]Michael J. Greenwood and P. J. Gormely, "A Comparison of the Determinants of White and Nonwhite Interstate Migration," Demography, 8 (1), February, 1971, pp. 141-155.

[11]Michael J. Greenwood, "Research on Internal Migration in the United States: A Survey," Journal of Economic Literature, 13 (2), June, 1975, pp. 397-433.

[12]Ibid., p. 399.

[13]L. E. Gallaway, R. F. Gilbert, and P. E. Smith, "The Economics of Labor Mobility: An Empirical Analysis," Western Economic Journal, 5 (3), June, 1967, pp. 211-223.

[14]R. J. Cebula, R. M. Kohn, and R. K. Vedder, "Some Determinants of Interstate Migration of Blacks, 1965-1970," Western Economic Journal, 11 (4), December, 1973, pp. 500-505.

Migration has also been considered to be selective with respect to sex. However, the evidence is not clear-cut in this case. Although it has been generally held that males are more migratory than females (by virtue of being more exploratory and less confined by traditions), current research indicates that not only is sex of less selectivity than age, but that it is less uniform over time and place. There has been some question as to the changing nature of sex selectivity, particularly as societies develop and females take a more active part in the labor force. Thus, no broad generalization can be made about sex selectivity. However, it does appear to vary with particular sociocultural and temporal settings.

The effect of income level upon the propensity to migrate has been incorporated in the discussion on education selectivity and race selectivity. The relevance of occupational differentials for analyzing migration flows depends upon the socioeconomic context. In the early stages of development there is the abundantly documented rural-to-urban flow. Later it is the services sector that absorbs a large number of migrants out of other occupations. Consequently, the importance of this factor depends heavily upon the contrasts between the sending and receiving areas within their socioeconomic contexts.

The most important migration flow related to the occupational characteristics has historically been the movement of people off the farms. Hathaway and Perkins have found that the selectivity of farm migration follows the same general pattern as that discussed above.[15] Local labor markets are of crucial importance to farm workers who seem

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[15]Dale E. Hathaway and Brian B. Perkins, "Farm Labor Mobility, Migration and Income Distribution," American Journal of Agricultural Economics, 50 (May, 1968), pp. 342-353.

to prefer to make the rural to urban move in a series of steps. This is especially true of whites migrating from the South. Migration, especially over long distances, was found to decline with age and was high among farm wage workers. (The latter is so because the ownership of farm assets, which serves to reduce the mobility of farmers, does not act as a deterrent to wage workers.) Migration, particularly long-distance, was less common in low-income areas and in areas lacking a commercialized agriculture. Those with farm employment closest to large urban areas had a higher propensity to migrate. Negroes were found to have a greater propensity to migrate over long distances.

Hathaway and Perkins found that all farm migrant movers obtained employment in places with populations of less than 50,000.

> Thus, even when farm people leave their local community for nonfarm employment, most of them do not go to the largest cities. But among those who went to cities of over one million, the proportion returning to farming was much lower than for the small labor markets. The obvious explanation was found in the relation between mobility returns and city size: both employment stability and long-run earnings increased with city size for migrants and nonmigrants alike.[16]

Although the authors found that the rate of back-movement into agriculture offsets 90 percent of the mobility out of the industry, thus suggesting that farm-nonfarm migration has proved to be inadequate for bringing about labor market equilibrium, this finding is questionable. Farm population has declined so much since WWII that back-movement into agriculture could not have been so large.

Again, returning to the occupational selectivity of migration, it has been found that those of professional and managerial occupations

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[16] Ibid., p. 350.

are more migratory than their counterparts. The more highly skilled also migrate over longer distances, on average, pointing to the fact that the market for their skills is more nearly national in size.

Several other characteristics have been examined in the literature for their migration selectivity. It has been found that those renting accommodations are more likely to migrate than homeowners. However, this may be an effect rather than a cause of migration, since migrants are more likely initially to rent than to purchase homes. Being renters they find it easier to move again than if they were homeowners. The effects of family and marital status on the propensity to migrate seem to depend upon the characteristics of the particular society. Thus, in traditional societies like India, the joint family system has historically acted as a much greater deterrent to migration than the single unit family in this country.

In conclusion, it can be said that a description of the characteristics of those who migrate is very important in understanding the socioeconomic implications of migration on sending and receiving regions. In any area, one would expect some of the age-sex-race classes to gain and others to lose. This means that migration brings about some change in the relative composition of any area's labor force.

There obviously are exceptions to these generalizations about migration selectivity. The migration propensities of some age and race classes are likely to deviate from the expected. One particular exception to the above findings is the education-skill-occupation complex: the market for more highly qualified workers is less restricted spatially, and the supply of such workers is especially heavily weighted with older male non-Negroes. It is also necessary to

be precise about the kind of movement one is referring to. Thus, Hathaway and Perkins found that in the southern states, the job mobility of whites is greater than that of nonwhites, but nonwhites are more migratory than whites.[17] The reason is racial discrimination in employment in the South.

The Selectivity of Migration in Oklahoma

In this section, the BEA migration data for six Oklahoma counties have been analyzed for selectivity with regard to the demographic and economic characteristics of the population.[18] Six counties were selected: Tulsa and Oklahoma counties which are the core counties of the Tulsa and Oklahoma City SMSA's; Harper, Kiowa, Atoka and Ottawa counties which were selected as representative of the Northwestern, Southwestern, Southeastern and Northeastern regions, respectively, The results on age, sex and race selectivity have been tabulated in Tables II-VII. The out-migration data were used in analyzing the selectivity of migration, since they are a more meaningful measure of the propensity to migrate of state residents than are the in-migration data (because the in-migration data include a component of interstate migration).

The method of tabulation is that used by Bunting, Ashby and Prosper.[19] Tables II-VII show out-migrants as a percentage of the covered work force, and the percentage differentials by age, sex and

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[17] Ibid., p. 350.

[18] "Migration Summary." Unpublished computer tape, (Washington, D.C., 1975).

[19] R. L. Bunting, L. D. Ashby, and P. A. Prosper, Jr., "Labor Mobility in Three Southern States," Industrial and Labor Relations Review, 14 (February, 1961), pp. 432-445.

TABLE II

PERCENTAGE OF OUT-MIGRANTS AND PERCENTAGE DIFFERENTIALS FOR WORKERS IN OKLAHOMA COUNTY, 1971-1973[1]

Race and Sex	Age: Out-Migration Percentages: All Ages	Age: Out-Migration Percentages: Less than 30	Age: Out-Migration Percentages: 30 and Over	Age: Percentage Differentials
All Workers	12.2	17.1	9.8	74.5
Males	16.2	18.7	12.2	53.3
Females	9.2	15.0	6.3	138.1
Negroes	10.2	12.5	9.1	11.0
Males	12.3	14.5	11.3	28.3
Females	8.0	10.4	6.8	52.9
Non-Negroes	12.3	17.5	9.9	76.8
Males	14.4	19.0	12.2	55.7
Females	9.3	15.5	6.3	146.0

Race and Age	Sex: Both Sexes	Sex: Males	Sex: Females	Sex: Differentials
All Workers	12.2	14.2	9.2	54.3
Less than 30	17.1	18.7	15.0	24.7
30 and Over	9.8	12.2	6.3	93.7
Negroes	10.2	12.3	8.0	53.8
Less than 30	12.5	14.5	10.4	39.4
30 and Over	9.1	11.3	6.8	66.2
Non-Negroes	12.3	14.4	9.3	54.8
Less than 30	17.5	19.0	15.5	22.6
30 and Over	9.9	12.2	6.3	93.7

Sex and Age	Race: Total	Race: Negro	Race: Non-Negro	Race: Differentials
All Workers	12.2	10.2	12.3	-17.1
Less than 30	17.1	12.5	17.5	-28.6
30 and Over	9.8	9.1	9.9	-8.1
Males	14.2	12.3	14.4	-14.6
Less than 30	18.7	14.5	19.0	-23.7
30 and Over	12.2	11.3	12.2	-7.4
Females	9.2	8.0	9.3	-14.0
Less than 30	15.0	10.4	15.5	-32.9
30 and Over	6.3	6.8	6.3	7.9

[1]The method by which the out-migration percentages and the percentage differentials in this and the following five tables were calculated is outlined on page 24.

TABLE III

PERCENTAGE OF OUT-MIGRANTS AND PERCENTAGE DIFFERENTIALS FOR WORKERS IN TULSA COUNTY, 1971-1973

Race and Sex	Age			
	Out-Migration Percentages			Percentage
	All Ages	Less than 30	30 and Over	Differentials
All Workers	13.82	20.24	11.19	80.88
Males	15.91	22.92	13.36	71.56
Females	9.84	15.92	7.05	125.82
Negroes	12.88	19.87	9.90	100.71
Males	12.60	22.04	8.69	153.62
Females	13.37	16.38	12.02	36.27
Non-Negroes	13.88	20.27	11.38	78.12
Males	16.13	22.98	13.66	68.23
Females	9.57	15.98	6.67	138.23

Race and Age	Sex			
	Both Sexes	Males	Females	Differentials
All Workers	13.82	15.91	9.84	61.69
Less than 30	20.24	22.92	15.92	43.97
30 and Over	11.91	13.36	7.05	89.50
Negroes	12.88	12.60	13.87	-5.76
Less than 30	19.87	22.04	16.38	34.55
30 and Over	9.90	8.69	12.02	-27.79
Non-Negroes	13.88	16.13	9.57	68.55
Less than 30	20.27	22.98	15.89	44.62
30 and Over	11.38	13.66	6.67	104.80

Sex and Age	Race			
	Total	Negro	Non-Negro	Differentials
All Workers	13.82	12.88	13.88	-7.20
Less than 30	20.24	19.87	20.27	-1.97
30 and Over	11.19	9.90	11.38	-13.01
Males	15.92	12.60	16.13	-21.88
Less than 30	22.92	22.04	22.98	-4.09
30 and Over	13.36	8.69	13.66	-36.88
Females	9.84	13.37	9.57	39.71
Less than 30	15.92	16.38	15.89	3.08
30 and Over	7.05	12.02	6.67	80.21

TABLE IV

PERCENTAGE OF OUT-MIGRANTS AND PERCENTAGE DIFFERENTIALS FOR WORKERS IN ATOKA COUNTY, 1971-1973

Race and Sex	Age: Out-Migration Percentages: All Ages	Age: Out-Migration Percentages: Less than 30	Age: Out-Migration Percentages: 30 and Over	Age: Percentage Differentials
All Workers	5.9	15.0	3.7	305.4
Males	11.1	27.3	7.0	290.0
Females	0	0	0	0
Negroes	--	--	--	--
Males	--	--	--	--
Females	0	--	0	--
Non-Negroes	5.9	15.0	3.7	305.4
Males	11.1	27.3	7.0	290.0
Females	0	0	0	0

Race and Age	Sex: Both Sexes	Sex: Males	Sex: Females	Sex: Differentials
All Workers	5.9	11.1	0	∞
Less than 30	15.0	27.3	0	∞
30 and Over	3.7	7.0	0	∞
Negroes	--	--	0	∞
Less than 30	--	--	--	--
30 and Over	--	--	0	∞
Non-Negroes	5.9	11.1	0	∞
Less than 30	15.0	27.3	0	∞
30 and Over	3.7	7.0	0	∞

Sex and Age	Race: Total	Race: Negro	Race: Non-Negro	Race: Differentials
All Workers	5.9	--	5.9	--
Less than 30	15.0	--	15.0	--
30 and Over	3.7	--	3.7	--
Males	11.1	--	11.1	--
Less than 30	27.3	--	27.3	--
30 and Over	7.0	--	7.0	--
Females	0	0	0	0
Less than 30	0	--	0	--
30 and Over	0	0	0	0

TABLE V

PERCENTAGE OF OUT-MIGRANTS AND PERCENTAGE DIFFERENTIALS FOR WORKERS IN HARPER COUNTY, 1971-1973

Race and Sex	Age: Out-Migration Percentages: All Ages	Age: Out-Migration Percentages: Less than 30	Age: Out-Migration Percentages: 30 and Over	Age: Percentage Differentials
All Workers	20.5	40.0	16.4	143.9
Males	27.3	50.0	23.7	111.0
Females	13.6	33.3	8.6	287.2
Negroes	--	--	--	--
Males	--	--	--	--
Females	--	--	--	--
Non-Negroes	20.5	40.0	16.4	143.9
Males	17.3	50.0	23.7	111.0
Females	13.6	33.3	8.6	287.2

Race and Age	Sex: Both Sexes	Sex: Males	Sex: Females	Sex: Differentials
All Workers	20.5	27.3	13.6	100.7
Less than 30	40.0	50.0	33.3	50.2
30 and Over	16.4	23.7	8.6	175.6
Negroes	--	--	--	--
Less than 30	--	--	--	--
30 and Over	--	--	--	--
Non-Negroes	20.5	27.3	13.6	100.7
Less than 30	40.0	50.0	33.3	50.2
30 and Over	16.4	23.7	8.6	175.6

Sex and Age	Race: Total	Race: Negro	Race: Non-Negro	Race: Differentials
All Workers	20.5	--	20.5	--
Less than 30	40.0	--	40.0	--
30 and Over	16.4	--	16.4	--
Males	27.3	--	27.3	--
Less than 30	50.0	--	50.0	--
30 and Over	23.7	--	23.7	--
Females	13.6	--	13.6	--
Less than 30	33.3	--	33.3	--
30 and Over	8.6	--	8.6	--

TABLE VI

PERCENTAGE OF OUT-MIGRANTS AND PERCENTAGE DIFFERENTIALS FOR WORKERS IN KIOWA COUNTY, 1971-1973

Race and Sex	Age			
	Out-Migration Percentages			Percentage
	All Ages	Less than 30	30 and Over	Differentials
All Workers	16.5	34.6	7.8	343.6
Males	23.3	45.0	12.3	265.9
Females	7.1	0	3.7	-100.0
Negroes	33.3	100.0	0	∞
Males	33.3	100.0	0	∞
Females	--	--	--	--
Non-Negroes	15.7	30.6	7.9	287.3
Males	22.4	40.5	12.9	214.0
Females	3.6	0	3.7	-100.0

Race and Age	Sex			
	Both Sexes	Males	Females	Differentials
All Workers	16.5	23.3	7.1	228.2
Less than 30	34.6	45.0	0	∞
30 and Over	7.8	12.3	3.7	69.9
Negroes	33.3	38.3	--	--
Less than 30	100.0	100.0	--	--
30 and Over	0	0	--	--
Non-Negroes	15.7	22.4	3.6	18.8
Less than 30	30.6	40.5	0	∞
30 and Over	7.9	12.9	3.7	248.6

Sex and Age	Race			
	Total	Negro	Non-Negro	Differentials
All Workers	16.5	33.3	15.7	112.1
Less than 30	34.6	100.0	30.6	226.8
30 and Over	7.8	0	7.9	-100.0
Males	33.3	33.3	22.4	48.7
Less than 30	100.0	100.0	40.5	146.9
30 and Over	0	0	12.9	-100.0
Females	15.7	--	3.6	--
Less than 30	30.6	--	0	--
30 and Over	7.9	--	3.7	--

TABLE VII

PERCENTAGE OF OUT-MIGRANTS AND PERCENTAGE DIFFERENTIALS FOR WORKERS IN OTTAWA COUNTY, 1971-1973

Race and Sex	Age: Out-Migration Percentages: All Ages	Age: Out-Migration Percentages: Less than 30	Age: Out-Migration Percentages: 30 and Over	Age: Percentage Differentials
All Workers	16.8	22.3	5.8	284.5
Males	32.7	42.8	9.5	350.5
Females	10.8	14.1	4.6	206.5
Negroes	--	--	--	--
Males	--	--	--	--
Females	--	--	--	--
Non-Negroes	16.8	22.3	5.8	284.5
Males	32.7	42.8	9.5	350.5
Females	10.8	14.1	4.6	206.5

Race and Age	Sex: Both Sexes	Sex: Males	Sex: Females	Sex: Differentials
All Workers	16.8	32.7	10.8	202.8
Less than 30	22.3	42.8	14.1	203.5
30 and Over	5.8	9.5	4.6	106.5
Negroes	--	--	--	--
Less than 30	--	--	--	--
30 and Over	--	--	--	--
Non-Negroes	16.8	32.7	10.8	202.8
Less than 30	22.3	42.8	14.1	203.5
30 and Over	5.8	9.5	4.6	106.5

Sex and Age	Race: Total	Race: Negro	Race: Non-Negro	Race: Differentials
All Workers	16.8	--	16.8	--
Less than 30	22.3	--	22.3	--
30 and Over	5.8	--	5.8	--
Males	32.7	--	32.7	--
Less than 30	42.8	--	42.8	--
30 and Over	9.5	--	9.5	--
Females	10.8	--	10.8	--
Less than 30	14.1	--	14.1	--
30 and Over	4.6	--	4.6	--

race. The out-migration percentages are calculated by finding the number of out-migrants in each category as a percentage of the number of workers in covered employment initially in that category. The percentage differentials are calculated in the following manner. For age selectivity, the out-migration percentage for the over-30 group is subtracted from that for the under-30 group, and the difference is expressed as a percentage of the former. This gives one a measure of how much more migratory the younger workers are compared with the older workers. In the same way, percentage differentials are calculated to measure how much more migratory males are then females, and Negroes are than non-Negroes.

Age

In all the counties, the younger workers are consistently more migratory than the older workers. In Tulsa county they are at least 70 percent more migratory except for young Negro females who are about 36 percent more migratory. In Oklahoma county, the younger workers are at least 50 percent more migratory except for young Negro males who are about 28 percent more migratory. For the smaller counties, the sample may not be large enough to yield reliable estimates by demographic breakdown. Some of the categories had no workers in the initial work force, but for the categories that were represented, the data show the younger workers to be relatively at least twice as migratory. The much larger percentage differentials for these smaller counties are due to the much smaller absolute numbers involved.

This pattern of age selectivity is expected. The differential mobility of the two age groups is greater than that found by Bunting,

Ashby and Prosper.[20] Their analysis for workers in North Carolina, South Carolina, and Georgia in 1953 yielded percentage differentials of approximately 40 percent for most categories. The difference in magnitude between their results and those of this study may be due to the difference in the definitions of mobility used. They define mobile workers as those who had at least two employers during their year of study (1953), whereas in this analysis, mobile workers have been identified with out-migrants--those whose county and/or state of employment was different over a two-year period. However, the more probable explanation is that younger people have become more migratory over time. This is borne out by data collected by the U. S. Bureau of the Census.[21] These data analyze state out-migration rates for different age groups by race and sex for the period 1970-1975. The data show that when out-migration rates for the age groups 20-24 and 45-49 are compared, younger black males and females, and younger white females are seen to be at least twice as migratory as the older group. However, younger white males are seen to be only 50 percent more migratory, on average. Since these data cover the same time period as this study, they provide a better basis for comparison.

In this study, by and large, the percentage differential for young females is seen to be about twice as large as that for young males, hinting that "mobility among females falls off more sharply than that for males with increases in age".[22] This result is very similar to

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[20] Ibid., p. 436.

[21] U. S. Bureau of the Census, Current Population Reports: Illustrative Projections of State Populations by Age, Race and Sex, 1975 to 2000, Series P-25, No. 796, Table A-6.

[22] R. L. Bunting, L. D. Ashby, and P. A. Prosper, Jr., p. 436.

that obtained by Bunting, Ashby and Prosper, who obtained a male percentage differential of about 40 percent and a female percentage differential of approximately 75 percent.[23] There are some exceptions, of course, and these are more likely to manifest themselves at the county level than for a three-state area. Thus, in Tulsa county, the opposite is seen to be the case for male Negroes whose mobility falls off more rapidly with age than for Negro females. Again, these results are in conformity with the findings from the Census Bureau data. The latter show that among white labor force members, the mobility for females falls off much more rapidly with age than it does for males, although this is not true for black workers.

Sex

Comparing the propensity to migrate along sex lines, females are seen to be less migratory than males, almost without exception. The one exception is Negro females over 30 years of age in Tulsa county. The Negro male-female differentials are all smaller than those found by Bunting, Ashby and Prosper, possibly pointing to the changing nature of sex selectivity mentioned in Section I. However, this is not so in the case of white male-female differentials that are found to be larger in this study. The Census Bureau data, covering the period 1970-1975, show mixed results.[24] Among the 25-29 age group, white females are about 25 percent more migratory than white males, while black males are 10 percent more migratory than black females in about half the states,

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[23] Ibid., p. 436.

[24] U. S. Bureau of the Census, Series P-25, No. 796.

with black females 10 percent more migratory than black males in the other half of the nation. However, among the 45-49 age group, white males are about 5 percent more migratory than white females on the whole, while black males are 10 percent more migratory than black females in one-third of the states, and black females are 25 percent more migratory than black males in the remaining two-thirds of the states. These data, then, do not point to any clear-cut difference among males and females in their propensity to move. The sex selectivity of migration seems indeed to have diminished, or almost disappeared, over time.

Although the results on sex selectivity of migration seem a little surprising, those on age selectivity were expected on the basis of other theoretical and empirical work. However, it will be seen later in the empirical analysis which is based on data for all 77 counties of Oklahoma that relative youth of the work force and migration are not related when other factors are controlled. This result is contrary to the conclusion on age selectivity arrived at in this section for the six counties being studied. Therefore, it seems that any conclusion drawn about the whole state on the basis of a few counties need not be accurate. On the basis of the following empirical analysis, during the time period covered, the younger members of Oklahoma's work force were not consistently more migratory than the other workers.

Race

Going on to racial selectivity, Tables II-VII show non-Negroes to be more migration prone than Negroes, except for females in Tulsa county and older females in Oklahoma county. Non-Negroes are found to

be 17 percent and 7 percent more migratory than Negroes in Oklahoma and Tulsa counties, respectively. The empirical findings of other studies are at variance among themselves on the subject of the selectivity of migration along racial lines. Bunting, Ashby, and Prosper found that in the early 1950s Negroes were more mobile than non-Negroes in the Southern states of North Carolina, South Carolina, and Georgia.[25] Hathaway and Perkins, on the other hand, found that though Negroes were less mobile in the South than non-Negroes in the mid-1960s, they were more migratory than the latter over longer distances.[26] The Census Bureau data, however, are in agreement with the results of this study.[27] The former show that non-black females are more than twice as migratory as black females in half the states, and they are at least 20 percent more migratory than the latter in all but five of the remaining states. Similarly non-black males are more than twice as migratory as black males in about half the states, and at least 20 percent more migratory than the latter in all but eight of the remaining states.

Education

The BEA data have no information on the educational level attained by covered workers. Therefore, it is not possible to say anything about the education selectivity of migration or about the positive relationship between educational level and distance of migration.

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[25] R. L. Bunting, L. D. Ashby, and P. A. Prosper, Jr., p. 436.

[26] Dale E. Hathaway and Brian B. Perkins, pp. 342-353.

[27] U. S. Bureau of the Census, Series P-25, No. 796.

Income Level

The BEA data on migrant structure for all six counties show the out-migration percentages to be largest for the under $2,000 per year wage class, approximately 40 percent of all workers in this category migrating out of it. The under $5,000 per year wage class lost approximately 26 percent of its initial covered work force. However, only 15-20 percent of workers in the $10,000-$15,000 per year wage class migrated out of it. Thus, it seems that relatively more out-migrants come from the lower salary groups as expected. These data seem to justify the use of income differentials as a relevant economic variable in explaining the decision to migrate.

Occupation

It is an established fact that migration selectivity can also be associated with occupational structure. For example, during a certain stage in the development of a nation's economy, rural-to-urban migration has been seen to dominate all other migration flows. The question is whether migration in Oklahoma during 1971-1973 was selective of workers in certain occupations. Again, taking the same six counties, the out-migration percentages were largest for mining (about 35 percent), followed by contract construction and trade (about 30 percent). Agriculture and the transportation sector fall in the middle of the range of out-migration rates with about 25 percent of their initial work force migrating out during the two-year period. The lowest out-migration rates occurred in mining, the services sector, the government sector, and in finance, insurance and real estate, these occupations experiencing gross out-migration of approximately 20 percent of their

initial work force. Since the differences in out-migration rates from the various occupations are seen to have been fairly small, it is difficult to say whether or not migration in Oklahoma was actually selective of workers in particular occupations during the time period studied.

The study of migration selectivity is of great interest to regional planners. The fact that many studies have found migration to be selective of the relatively younger members of the labor force (coupled with the fact that as a rule, migrants have also been found to be better educated and more highly-skilled) has often led to the contention that out-migration gradually deprives depressed areas of some of the most desirable elements of their labor force. The analysis above showed that migrants do move in response to better economic opportunities, since the out-migration percentages were largest for the relatively lower wage classes. Since migration out of the six counties studied here was seen to be selective of the relatively younger work force members, the rural-to-urban migration that occurred between 1950 and 1970 in Oklahoma surely had an unfavorable impact upon the structure of the labor force, at least in some of the rural areas.[28] Another

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[28]Actually from 1950 to 1960, all but nine counties of Oklahoma experienced a decline in the median age of their population. Three of the exceptions (Cleveland, Oklahoma and Tulsa) were metropolitan counties. However, during 1960-1970, although 26 counties still experienced an increase of two years or greater in the median age of their population, the others either had a slight decline or relative stability in their median age. This indicates the detrimental effect on the age structure of the population resulting from the net out-migration from Oklahoma during 1950-1960 and from the rural-to-urban migration. Again, the small net in-migration during 1960-1970, and the slowing down of the rural-to-urban migration, resulted in a reversal of the trend of an aging population for many counties, indicating what a potent force migration can be in altering the structure of the labor force. Median age by county for the period 1950-1970 is tabulated in Appendix B.

implication of the age selectivity of migration is that after migration has gone on for some time, the population remaining in depressed areas will gradually show a reduced mobility potential. Once this happens, any policy of encouraging migration out of the area will require increasingly strong economic incentives. The regional policymaker might then find that he has to supplement a policy of encouraging out-migration with other measures.

The above analysis indicates that since migration can be selective of certain groups of people, it becomes important to incorporate migrant characteristics into any theoretical model of migration. If this is done, it will provide regional planners with some migration elasticities that show the migration propensities of different groups in the labor force. This is the kind of information that policymakers need. Migration selectivity will be incorporated into the analysis in the following chapters insofar as is permitted by the availability of data.

Migration Selectivity and the Structure of the Labor Force

The selective nature of migration can eventually lead to important changes in the composition of any area's labor force. The BEA migration data have been analysed to show this for the same six counties that were studied in the previous section. The method of analysis is again that utilized by Bunting, Ashby and Prosper.[29] The net migration results for the six counties have been tabulated in Tables VIII-XIII.

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[29] R. L. Bunting, L. D. Ashby, and P. A. Prosper, Jr., p. 441.

TABLE VIII

NET MIGRATION--ABSOLUTE AND AS A PERCENTAGE OF COVERED EMPLOYMENT IN OKLAHOMA COUNTY, 1971-1973

Age	Total	Negro			Non-Negro		
		Both Sexes	Males	Females	Both Sexes	Males	Females
Net Migration:							
Less than 30	3570	460	390	70	3110	2190	920
30-49	6380	930	740	190	5450	4380	1070
49 and Over	3780	400	340	60	3380	2330	1050
Total	13730	1790	1470	320	11940	8900	3040
Net Migration as a Percent of Covered Employment:							
Less than 30	5.2	8.0	13.5	2.4	4.9	5.9	3.5
30-49	7.0	8.2	19.0	5.3	6.9	9.0	3.5
49 and Over	6.6	8.6	14.4	2.6	6.4	7.7	4.7
Total	6.4	8.2	16.1	3.7	6.1	7.7	3.8

TABLE IX

NET MIGRATION--ABSOLUTE AND AS A PERCENTAGE OF COVERED EMPLOYMENT IN TULSA COUNTY, 1971-1973

Age	Total	Negro			Non-Negro		
		Both Sexes	Males	Females	Both Sexes	Males	Females
Net Migration:							
Less than 30	390	-280	-190	-90	670	640	30
30-49	450	300	430	-130	150	160	-10
49 and Over	1060	330	270	60	730	460	270
Total	1900	350	510	-160	1550	1260	290
Net Migration as a Percent of Covered Employment:							
Less than 30	0.89	-9.27	-10.22	-7.76	1.64	2.54	0.19
30-49	0.66	0.64	15.81	-6.53	0.24	0.37	-0.05
49 and Over	2.48	13.98	15.25	10.17	1.81	1.76	1.89
Total	1.23	3.47	0.80	-4.28	1.07	1.32	0.58

TABLE X

NET MIGRATION--ABSOLUTE AND AS A PERCENTAGE OF COVERED EMPLOYMENT IN ATOKA COUNTY, 1971-1973

Age	Total	Negro			Non-Negro		
		Both Sexes	Males	Females	Both Sexes	Males	Females
Net Migration:							
Less than 30	0	--	--	--	0	0	0
30-49	0	--	--	--	0	0	0
49 and Over	60	--	--	--	60	0	60
Total	60	--	--	--	60	0	60
Net Migration as a Percent of Covered Employment:							
Less than 30	0	--	--	--	0	0	0
30-49	0	--	--	--	0	0	0
49 and Over	31.6	--	--	--	31.6	0	31.6
Total	31.6	--	--	--	31.6	0	31.6

TABLE XI

NET MIGRATION--ABSOLUTE AND AS A PERCENTAGE OF COVERED EMPLOYMENT IN HARPER COUNTY, 1971-1973

Age	Total	Negro			Non-Negro		
		Both Sexes	Males	Females	Both Sexes	Males	Females
Net Migration:							
Less than 30	0	--	--	--	0	30	-30
30-49	-30	--	--	--	-30	0	-30
49 and Over	30	--	--	--	30	-30	60
Total	0	--	--	--	0	0	0
Net Migration as a Percent of Covered Employment:							
Less than 30	0	--	--	--	0	50.0	-33.3
30-49	-7.7	--	--	--	-7.7	0	-16.7
49 and Over	8.8	--	--	--	8.8	-17.6	35.3
Total	0	--	--	--	0	0	0

TABLE XII

NET MIGRATION--ABSOLUTE AND AS A PERCENTAGE OF COVERED EMPLOYMENT IN KIOWA COUNTY, 1971-1973

Age	Total	Negro			Non-Negro		
		Both Sexes	Males	Females	Both Sexes	Males	Females
Net Migration:							
Less than 30	-30	-30	0	0	0	-60	60
30-49	-180	0	0	0	-180	-90	-90
49 and Over	0	30	30	30	-30	-60	30
Total	-210	0	30	30	-210	-210	0
Net Migration as a Percent of Covered Employment:							
Less than 30	-5.8	-100.0	-100.0	0	0	-16.2	50.0
30-49	-21.7	0	0	0	-22.5	-23.7	-21.4
49 and Over	0	0	0	∞	-4.8	-18.75	10.0
Total	-10.5	-33.3	-33.3	∞	-11.0	-19.6	0

TABLE XIII

NET MIGRATION--ABSOLUTE AND AS A PERCENTAGE OF COVERED EMPLOYMENT IN OTTAWA COUNTY, 1971-1973

Age	Total	Negro			Non-Negro		
		Both Sexes	Males	Females	Both Sexes	Males	Females
Net Migration:							
Less than 30	-310	--	--	--	-310	-340	30
30-49	-60	--	--	--	-60	-150	90
49 and Over	-30	--	--	--	-30	-90	60
Total	-400	--	--	--	-400	-580	180
Net Migration as a Percent of Covered Employment:							
Less than 30	-14.9	--	--	--	-14.9	-23.4	4.8
30-49	-1.9	--	--	--	-1.9	-7.1	9.4
49 and Over	-1.2	--	--	--	-1.2	-6.0	6.3
Total	-5.3	--	--	--	-5.3	-11.5	7.1

In-migrants are those workers whose covered employment was outside the county of study in 1971, but was inside the county in 1973. Out-migrants are those who were employed in the relevant county in 1971 and outside it in 1973. Net migration is the difference between the numbers of in-migrants and out-migrants. Thus, a positive sign for net migration means net inflow of workers into the county, while a negative sign means a net outflow of workers from the county.

In absolute numbers, Oklahoma and Tulsa counties gained workers through migration in each category during 1971-1973. Of the four smaller counties, Atoka gained workers, Harper had zero net in-migration, while Kiowa and Ottawa had more out- than in-migrants. This is in conformity with the migration trends discussed in Chapter I. Oklahoma had a continuation of rural-to-urban migration during this period (though at a slower pace than during the previous two decades). The counties of western Oklahoma experienced either no gain or a net loss from migration, while the lake counties of eastern Oklahoma increasingly experienced net in-migration, especially of retirees.

The effect on the relative composition of the area's labor force can be seen more clearly by looking at net in-migration as a percentage of the initial covered employment in each age and sex-race class. These percentages are tabulated in the lower half of Tables VIII-XIII. Of particular interest is the effect of migration on the age composition of the labor force. In the previous section it was argued that since the younger workers can be relatively more migratory, one might expect the labor force in the areas experiencing net out-migration to gradually become older. This is seen to be the case in all four nonmetropolitan counties. Atoka was the only nonmetropolitan county that experienced

net in-migration and all of it was into the over 50 age group. Ottawa and Kiowa counties had net out-migration from each age group, but it was greatest in the under-30 age group. Harper county had net out-migration in the under-50 age group and net in-migration into the over-50 age group. Therefore, the age selectivity of migration did alter the age composition of the labor force in the nonmetropolitan counties studied here. However, as mentioned in the previous section it is dangerous to generalize this conclusion and say that the work force in all nonmetropolitan areas ended up being older due to migration.

In Tulsa county the percentage gain from net in-migration was largest for the middle age group, next for the oldest group, and smallest for the youngest group. In Oklahoma county, the percentage gain was largest for the oldest group, then the youngest and lastly the middle age group. However, the differences are small and do not indicate any great impact on the age composition of the work force due to migration. Since both these counties saw large net gains through net in-migration, one might have expected that the under-30 and under-50 age groups would experience distinctly bigger net gains. However, it was mentioned that the empirical analysis of the following chapters will show that migration was not more selective of the younger age groups for all the counties taken together. Since much of the net gain for Tulsa and Oklahoma counties came from the net loss of the nonmetropolitan counties, this explains the fact that there was no discernable impact on the age composition of the two counties' labor force through migration.

Insofar as migration was selective of the younger members of the population at least in some counties and areas, there is some inequity

involved in that these losing areas, having invested in their younger and more able people, are not able to reap the benefits. This sort of implication of migration selectivity is of great interest to planners responsible for devising a set of policies that are efficient and "just".

In both Tulsa and Oklahoma counties, the overall percentage gain is greater for Negroes than for non-Negroes, and it is greater for males than for females. For the smaller counties, there are too many blank categories to make any statement about the effect of migration on the racial composition of the labor force. However, the percentage gains are greatest for the males and the losses are greatest for the females. One would expect this result for the nonmetropolitan counties, since "in both the U. S. and Oklahoma, the female work force shows a greater tendency to reside in urban places than is the case for males."[30] This is because employment opportunities for females have been expanding most rapidly in the urbanized areas of the state. This kind of result also should be of interest to planners. Actually, any information on the impact of migration selectivity is useful in devising the optimum mix of policies for achieving any desired goal of regional development.

Summary

The research on selectivity has found that people with certain characteristics are relatively more migratory. The young, the better-educated and males have traditionally had relatively greater propensities to migrate. The age selectivity of migration for the six counties studied here corroborates the findings of other studies

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[30] G. M. Lage, R. L. Moomaw, and L. Warner, p. 30.

although it can be argued that younger workers have become more migratory over time. However, it will be shown in the empirical analysis of the following chapters that this was not so for all 77 counties of Oklahoma as a whole. Reasons for this will be discussed in Chapter V where the empirical results are interpreted. The sex and race selectivity results of migration found by this study are corroborated by Census Bureau data for the period 1970-1975. It seems that females have become as migratory as males over time, while nonblacks still are more migratory than blacks. Migration affects the composition of different regions' labor force. Some of the results obtained for Oklahoma are what one would expect and some are not. Of the six counties that were studied, the losing rural counties end up with an older work force through migration, that is composed of relatively more males. However, the two gaining metropolitan counties do not end up with a younger work force through migration because, presumably, all the counties in the state did not uniformly experience the same pattern of age selectivity as the four nonmetropolitan counties studied in this chapter.

The nature of migration selectivity and its effects are of importance to planners and the relevant variables should be incorporated in theoretical models of migration. An attempt will be made to do this in the following analysis.

CHAPTER III

A THEORETICAL MODEL OF MIGRATION AND EMPLOYMENT CHANGE

A great deal of work has been done on migration. Much of the analysis has used single equation models designed to explain gross or net migration as a function of various economic factors, without paying any attention to the consequences of that migration. However, since any measure of migration must cover a finite time period, it can in turn influence the end-of-the-period values of some of the explanatory variables. Recognizing this bilateral cause-effect relationship, some researchers have built and estimated simultaneous-equations models of migration. The model that will be tested in the following chapter falls into this latter class. It consists of three equations that have to be estimated simultaneously for the three dependent variables, in-migration into a region, out-migration from it, and employment change. The independent variables are quantifiable economic factors that theoretically should be able to explain the observed patterns of migration and employment change. Among the contributors to this category of migration research are Greenwood, Muth, Olvey, Persky and Kain, and Okun. Borts and Stein first tested the effect of migration on employment change. Before that, the cause-effect relationship was assumed to run from employment change to migration. They postulated a supply-dominated regional model with a perfectly elastic labor demand curve. In their

model, migration leads to an increase in labor supply that subsequently leads to an increase in employment.[1] Muth tested a modified version of the Borts-Stein model using data for SMSAs. Migration and employment were simultaneously determined in his model of the labor market. Despite underlying problems, Muth made an important contribution with his approach.[2] Olvey estimated a five-equation model of migration and employment change. His model was better specified since he used gross in- and out-migration instead of net migration.[3] Like Muth, Olvey found that migration and employment change are mutually dependent. Greenwood has also done much work in this area. He used a simultaneous equations model to study inter-SMSA migration.[4] There was an explicit acknowledgment of race in the 14 equation system that he used to analyze the determinants of white and non-white migration in another study.[5] In a third study, he constructed a simultaneous-equations model that took into account, "the interactions between various economic aspects of urban growth and migration to and from urban areas."[6] Persky and

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[1]G. H. Borts and J. L. Stein, Economic Growth in a Free Market (New York, 1964).

[2]Richard F. Muth, "Migration: Chicken or Egg?" Southern Economic Journal, 37 (8), January, 1971, pp. 295-306.

[3]L. D. Olvey, "Regional Growth and Interregional Migration--Their Pattern of Interaction," Review of Regional Studies, 2 (2), Winter, 1972, pp. 139-163.

[4]Michael J. Greenwood and Douglas Sweetland, "The Determinants of Migration Between Standard Metropolitan Statistical Areas," Demography, 9 (4), November, 1972, pp. 665-681.

[5]Michael J. Greenwood, "A Simultaneous-Equations Model of White and Nonwhite Migration and Urban Change," Economic Inquiry, XIV (1), March, 1976, pp. 1-15.

[6]Michael J. Greenwood, "A Simultaneous-Equations Model of Urban Growth and Migration," Journal of the American Statistical Association, 70 (352), December, 1975, pp. 797-810.

Kain estimated a simultaneous-equations model that included color-specific endogenous variables. Their model contained two employment-change equations, two migration equations, and two identities.[7] All these researchers found that employment change influences in- and out-migration and vice versa. Greenwood and Okun are among those who also introduced income growth as an endogenous variable.

The Model

In the tradition of the studies reviewed, the present model hypothesizes migration both influences the labor market situation and is influenced by it. The economic base model provides the theoretical basis for the employment change equation. The modified gravity-type model, formulated in the context of individual utility maximization, provides the theoretical basis for the in- and out-migration equations.

> In the economic base explanation of economic growth, the essential idea is that some activities in a region are peculiarly basic in the sense that their growth leads and determines the region's overall development; while other nonbasic activities are simply consequences of the region's overall development. If such an identification of basic activities can really be made, then an explanation of regional growth consists of two parts: (1) explaining the location of basic activities and (2) tracing the processes by which basic activities in any region give rise to an accompanying development of nonbasic activities. The usual economic base theory identifies basic activities as those which bring in money from the outside world, generally, by producing goods or services for export.[8]

Accordingly, overall employment change is hypothesized to be a function of change in basic employment. It is also supposed to be affected by

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[7] Joseph J. Persky and John F. Kain, "Migration, Employment, and Race in the Deep South," Southern Economic Journal, 36 (3), January, 1970, pp. 268-276.

[8] Edgar M. Hoover, An Introduction to Regional Economics (New York, 1974), pp. 219-222.

amount of migration that occurs.

In "gravity-type" models, "migration is hypothesized to be directly related to the size of the relevant origin and destination populations, and inversely related to distance."[9] In modified gravity models,

> . . . the variables of the basic gravity model are given behavioral content, and additional variables that are expected to importantly influence the decision to migrate are included in the estimated relationships. The additional variables are typically suggested as proxies for various arguments of individual utility functions.[10]

The in- and out-migration equations in the model developed here are based on this modified gravity-type approach.

The form of the equations to be tested is governed by the nature of the available data. The BEA migration data used here provide for each county, information on the total number of in-migrants from and out-migrants to the rest-of-the-state and each of the other 49 states.[11] Since there is no information on county of origin or destination, the two migration variables used in the model are in-migration into each county i, (IM_i), and out-migration from each county i, (OM_i). The third dependent variable is employment change for each county i, ($DELE_i$).

In-Migration

In-migration is a function of various "pull" factors that characterize the social framework and economic opportunities of any given region. In this study, in-migration will be taken to be a function of different

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[9] Greenwood (June, 1975), p. 398.

[10] Ibid., p. 398.

[11] Bureau of Economic Analysis, Regional Economic Analysis Division, (Washington, D.C., 1975).

combinations of the following variables: employment change, county per capita income, county population, county unemployment rate and net entrants into the labor force.

An increase in total employment is expected to induce in-migration. This is because an increase in the number of people employed is indicative of an expanding economy and is thereby indicative of a greater probability of finding employment. Another way of saying this is that labor mobility is one of the means by which the factor market eliminates disequilibrium between the demand for and supply of labor. An increase in employment which follows from an increased demand for labor, may indicate an excess demand for the latter; therefore, one would expect it to be directly related to the rate of in-migration.

The per capita income level of a region is expected to exert a direct influence on in-migration into that region. Actually, potential migrants would be attracted by relatively higher expected wages. Thus,

> Having taken into account his costs of movement, and given his occupation and training, the potential migrant will select that locality at which the real value of the expected net benefit that accrues to him from migration is greatest. The income that the individual expects to earn at each alternative destination is likely to enter importantly into his judgment concerning the benefits associated with each location.[12]

Ideally then, following this human capital approach to migration, a potential migrant would base his decision on a comparison of the present value of his lifetime income differential between sending and receiving regions and the economic and non-economic costs of

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[12]Michael J. Greenwood and Douglas Sweetland, p. 669.

migration.[13,14] However, as Greenwood points out,

> Although the migration models of economists are typically formulated in the context of individual utility maximization, the data employed in estimating the models are frequently aggregate in the sense that they refer to mean income or earnings levels in sending and receiving regions.[15]

The use of such aggregate income measures is an approximation only since they are not present value measures, nor are they migrant-specific. However, in the absence of the necessary data, regional per capita income is taken as a suitable proxy for the ideal measure. This is both in keeping with the approach of other researchers (for example, Muth[16]), and not unreasonable if the question asked is whether or not migration occurs from low-to-high income areas. Thus, on the basis of the measure used in this study, it would not be reasonable to try and answer the question whether and to what extent migrants benefit by moving.

The total population of a potential receiving region is important. A county with a relatively large population will attract a greater number of migrants merely by virtue of its size, since it will have a larger labor market. In addition, a large population is indicative of relatively greater urbanization and the amenity factors associated with that, thereby strengthening the positive relationship between population size and total in-migration. Yet another factor is that the greater a

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[13]Larry A. Sjaastad, "The Costs and Returns of Human Migration," Journal of Political Economy, 70 (5), October, 1962, pp. 80-93.

[14]Gene Laber and Richard X. Chase, "Inter-Regional Migration in Canada as a Human Capital Decision," Journal of Political Economy, 79 (4), July-August, 1971, pp. 775-804.

[15]Greenwood (June, 1975), p. 399.

[16]Muth (January, 1971), pp. 295-306.

region's population, the more likely a potential migrant will have friends and relatives there, who not only transmit relevant information about the place, but also act as a safety factor for the new migrant. Population size has been used as a proxy for some combination of the above-mentioned factors by many researchers. Thus Greenwood states,

> It is now generally argued that destination population size is a proxy for the size of the labor market, and the larger the size of the labor market, the greater are likely to be both the number and type of available job opportunities.[17]

Among those who have used population size as an explanatory variable in the analysis of migration are Greenwood,[18,19] Miller,[20,21] and Sahota.[22]

The rate of unemployment, being a barometer of job opportunities in a given region, should be inversely related to the in-migration variable. Unemployment indicates an excess supply of labor, and the higher the rate of unemployment, the more one would expect it to act as a deterrent to migration into a region. This should be true even if the rate of unemployment is relatively constant over fairly long periods because a higher rate implies that there are more unemployed people actively seeking work. The assumption here is that the relatively constant components of unemployment, such as the structurally unemployed

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[17] Greenwood (June, 1975), p. 419.

[18] Michael J. Greenwood and P. J. Gormly, pp. 141-155.

[19] Michael J. Greenwood and Douglas Sweetland, pp. 665-681.

[20] Edward Miller, "Is Out-Migration Affected by Economic Conditions?" Southern Economic Journal, 39 (3), January, 1973, pp. 396-405.

[21] Edward Miller, "Return and Nonreturn In-Migration," Growth and Change, (January, 1973), pp. 3-9.

[22] Gian S. Sahota, "An Economic Analysis of Internal Migration in Brazil," Journal of Political Economy, (1976), pp. 218-245.

and new entrants into the labor force, are roughly the same in different regions. Though not always true, this is a reasonable generalization. This variable has been used widely in attempting to explain migration patterns. Thus Todaro pointed out that the probability of finding employment is important in explaining rural-urban migration, and the unemployment rate prevailing in urban areas serves as a good proxy.[23] Others who have used the unemployment rate as an explanatory variable are Gallaway, Gilbert and Smith,[24] Sjaastad,[25] and Wadycki.[26]

Total entrants into the labor force minus total exits equals net entrants into the labor force. Since the BEA data are based on those who are employed, the greater the number of net entrants, the smaller is the excess demand for labor and thus for migrants. Therefore, in-migration should be inversely related to the number of net entrants into a region's labor force. A net entrants variable was not used in any of the studies that have been cited. It is available only as a result of the BEA classification procedure.

An in-migration function containing all of the above explanatory variables is written as follows:

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[23] M. J. Todaro, "A Model of Labor Migration and Urban Unemployment in Less Developed Countries," American Economic Review, 59 (1), March, 1969, pp. 138-148.

[24] L. E. Gallaway, R. F. Gilbert and P. E. Smith, "The Economics of Labor Mobility: An Empirical Analysis," Western Economic Journal, 5 (3), June, 1967, pp. 211-223.

[25] Larry A. Sjaastad, "The Relationship Between Migration and Income in the United States," Papers and Proceedings of the Regional Science Association, 6 (1), 1960, pp. 37-64.

[26] W. J. Wadycki, "Alternative Opportunities and Interstate Migration: Some Additional Results," Review of Economics and Statistics, 56 (2), May, 1974, pp. 254-257.

$$IM_i = f(DELE_i, PCY_i, POP_i, U_i, NENT_i, u_i)$$

where:

IM_i is the number of migrants into county i between the first quarter of 1971 and the first quarter of 1973;

PCY_i is the per capita income in county i in 1970-1971;

$DELE_i$ is the employment change in county i between the first quarters of 1971 and 1973;

POP_i is the total population of county i in 1970;

U_i is the unemployment rate in county i in 1971;

$NENT_i$ is the net entrants into the labor force in county i between the first quarters of 1971 and 1973; and

u_i is an error term.

Out-Migration

Out-migration can be explained by a number of "push" factors. Some of these are the demographic characteristics of potential migrants, and the others are indicative of the locational disadvantages of a given region. Different combinations of the following variables will be used in attempting to explain the behavior of out-migrants: the average educational achievement of the residents of a sending region, the relative youth of the residents of a sending region, the total population of the region, the region's employment change during the period under consideration, the net entrants into the region's labor force during the same period and the unemployment rate. It could also be hypothesized that the shorter the distance between any county and the nearest SMSA, the greater would be the out-migration from that county.

Greater educational accomplishment of a region's population should encourage mobility. This is because the higher the level of education, the greater are the perceived and actual opportunities elsewhere. Also, more education usually means that more information is available to potential migrants and there are fewer psychological barriers to migration. This variable has been used in the explanation of migration by several researchers. Schwartz,[27] Suval and Hamilton,[28] and Greenwood[29] are among those who have used some form of this variable in their studies. Thus Greenwood states, "Employment information and job opportunities are both expected to increase with increased education."[30]

The relative youth of a region's inhabitants may also have an important effect on their propensity to migrate. It is expected that the more heavily weighted is a region's population with "young" people, the greater will be the out-migration. The young are more mobile because they are likely to have fewer emotional ties to a location, less seniority in current jobs to worry about, and a greater number of years over which to realize any income gain from migration. Gallaway has shown that,

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[27]Aba Schwartz, "Interpreting the Effect of Distance on Migration," Journal of Political Economy, 81 (5), September-October, 1973, pp. 1153-1169.

[28]Elizabeth M. Suval and C. Horace Hamilton, "Some New Evidence on Educational Selectivity in Migration to and from the South," Social Forces, 43 (4), May, 1965, pp. 536-547.

[29]Michael J. Greenwood, "An Analysis of the Determinants of Geographic Labor Mobility in the United States," Review of Economics and Statistics, 51 (2), May, 1969, pp. 189-194.

[30]Greenwood (June, 1975), p. 406.

> . . . an annual earnings differential of about $85 will be just enough to compensate a worker for the bundle of objective and subjective costs of movement associated with an additional year of age.[31]

Also, as pointed out by Becker, if migration is profitable, the potential migrant will move sooner rather than later because this increases the proportion of returns discounted the least. Greenwood has used a youthfulness variable very similar to the one used in this study. He states, "Out-migration is thus expected to be lower the higher the median age of people in the SMSA, ceteris paribus."[32]

The larger a region's population, the greater the total number of out-migrants. One reason is simply that a relatively large population means a greater pool of potential migrants. Greenwood points out that,

> One of the most important contributions of the modified gravity model of migration is the addition of behavioral content to the population variables . . . the larger the size of the origin population, the greater the number of persons who are likely to have any given reason to migrate.[33]

Another reason is that the size of the population is likely to be directly related to the migrant stock of a given region. The migrant stock is composed of those residents of a county who were born in another state. Such individuals are more prone to out-migration because they have fewer roots in the state in which they reside. The migrant stock concept was introduced by Greenwood and used in a somewhat different way in his study of the determinants of geographic labor

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[31]Lowell E. Gallaway, "Age and Labor Mobility Patterns," Southern Economic Journal, 36 (2), October, 1969, pp. 171-180.

[32]Greenwood (December, 1975), pp. 797-810.

[33]Greenwood (June, 1975), p. 419.

mobility.[34] A similar point was raised by Miller in that areas with high in-migration rates tend to have high out-migration rates.[35]

The effect of employment change on out-migration should be the reverse of its effect on in-migration. One would expect an increase in employment to discourage out-migration. Insofar as increased employment is representative of an increase in the demand for labor, it should act as an inducement for residents to remain in the region instead of migrating elsewhere. In one of his migration studies, Miller states, "The primary hypotheses to be examined are that out-migration is reduced by high wages, rapidly growing employment, and warm winters, and increased by high rates of unemployment."[36] Greenwood states, "It is generally expected that out-migration will be lower and in-migration will be higher the greater the employment growth that occurs in a region, ceteris paribus."[37]

The number of net entrants into a region's labor force is expected to be directly related to the number of out-migrants. Given the demand for labor, the greater the addition to the labor force, the greater will be the excess supply of workers and the greater will be the incentive for the more migratory to move to another region.

The higher the rate of unemployment, the greater will be the out-migration, because of lack of opportunities in the region concerned. The argument here is analogous to that used to explain the relationship

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[34] Greenwood (1969), pp. 189-194.

[35] Miller (January, 1973), pp. 396-405.

[36] Ibid., pp. 396-405.

[37] Greenwood (December, 1975), p. 800.

between in-migration and the unemployment rate. Also, as pointed out by Greenwood, ". . . since the opportunity costs of migration are lower for unemployed CLF members, out-migration is expected to increase with . . . increased rate of unemployment."[38]

As mentioned above, an inverse relationship can be hypothesized between out-migration from a county and the distance between that county and the nearest SMSA. Here the assumption is that during the time period covered, there was an ongoing rural-to-urban movement. Then, the direction of the relationship is that predicted by the gravity model, since distance is considered to be a proxy for the transportation and psychic costs of moving. This variable has been widely used in migration models. Gallaway, Gilbert and Smith,[39], Sjaastad,[40] and Laber and Chase[41] are mong the researchers who have used a distance variable to explain internal migration.

An out-migration function containing all these explanatory variables would be as follows:

$$OM_i = f(PED_i, PYNG_i, POP_i, DELE_i, NENT_i, U_i, DIST_i, u_2)$$

where:

OM_i is the number of out-migrants from county i between the first quarters of 1971 and 1973;

PED_i is the percentage of county i's adult population with more than high school education in 1970;

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[38] Ibid., p. 800.

[39] L. E. Gallaway, R. F. Gilbert, and P. E. Smith, pp. 211-223.

[40] Sjaastad (October, 1962), pp. 80-93.

[41] G. Laber and R. X. Chase, pp. 795-804.

$PYNG_i$ is the median age of county i's population in 1970;

POP_i is the total population of county i in 1970;

$DELE_i$ is the employment change in county i between the first quarters of 1971 and 1973;

U_i is the unemployment rate in county i in 1971;

$DIST_i$ is the number of miles from county i to the closest of the three SMSAs: Tulsa, Oklahoma City, and Dallas; and

u_2 is an error term.

Employment Change

Employment change is hypothesized to be a function of the change in basic employment and of the amount of in-migration and out-migration that occurs. The equation for employment change, together with the in-migration and out-migration equations, completes the model.

According to the simplest version of the economic base theory, a change in basic employment leads to a multiple change in total employment. The reason for the greater than unity value of the basic employment change multiplier is that expansion of the basic sector is supported by an increase in the "outside" demand for the local products, as opposed to expansion of the non-basic sector which has to depend solely upon an increase in local demand. Richardson states,

> The economic base model is the oldest and simplest forecasting model in regional economics. It is based on the division of the regional economy into two sectors, typically a 'local service' sector and an 'export' sector. The service sector is then expressed as a function of the export sector, and on the assumption that this relationship is stable it is possible to forecast the future level of activity in the region as a whole by predicting future levels of exports. This approach emphasizes the role of external demand as the main determinant of regional economic performance, an important point in view

> of the 'openness' of regions, but probably too extreme in view of the model's neglect of supply side considerations such as labor-force growth.[42]

Much debate has centered on the division of activities between the local sector and the basic sector. As pointed out by Richardson, "Most studies have used one of three main techniques: ad hoc assignment, the location quotient method, and the minimum requirements technique." The approach used here is that of ad hoc assignment, with mining, manufacturing and agriculture classified as constituting the "basic" export sector of the economy, and all the others including retail trade, utilities, local government and services assigned to the "non-basic", non-export sector. This approach is theoretically inferior to the use of both the location quotients and the minimum requirements techniques. However, the simplifying assumptions made in the application of the two latter techniques raise doubts about their superiority in practice. For example, location quotients are likely to lead to an underestimate of a region's exports, since they are applied to whole industries or industry groups.[43] Also, the assumption of identical productivity and consumption per capita of each good or service in the region and nation is untenable. In the minimum requirements technique, the determination of "minimum" is very arbitrary and there is an implication that all regions export but none import.[44] Therefore, it was decided to use the approach of ad hoc assignment, since much less data is needed than for the other two techniques.

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[42] Harry W. Richardson, "The State of Regional Economics: A Survey Article," International Regional Science Review, 3 (1), Fall, 1978, pp. 1-48.

[43] Hoover, p. 220.

[44] Richardson, pp. 1-43.

Most regional economists have pointed out the shortcomings of the simple version of the economic base theory where a change in total employment is taken to be a function only of a change in basic employment. There are other variables that can impinge upon the relationship between total and basic employment change. One of these is the rate of unemployment. The closer the economy is to full employment and, therefore, the more inelastic is the supply of labor, the smaller one would expect the multiplier to be. Thus, if the product of change in basic employment and the rate of unemployment is taken to be an explanatory variable, one would hypothesize a direct relationship between it and the change in total employment. As pointed out by Richardson,

> Another problem is that the model assumes that there is sufficient excess capacity in the regional economy. If this condition does not hold, an expansion of the 'export' sector will require resource shifts out of the 'local' sector unless the supply of labor (and capital) to the local sector is highly elastic (through in-migration). To deal with this problem some adjustment needs to be made for the degree of regional unemployment.[45]

It can also be hypothesized that the larger the population of a county, the more closed it would be and, therefore, the larger would be the multiplier. Taking the product of county population and change in basic employment as an explanatory variable, one would expect its coefficient to have a positive sign. Hoover states that, "There is a discernible tendency for export multipliers to be larger with increasing regional size and diversity."[46] It has frequently been pointed out that import substitution has the same impact upon the regional economy

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[45]Ibid., p. 12.

[46]Hoover, p. 221.

as expansion of exports--in either case, there is an increase in sales by producers within the region. The larger a region in terms of population size, the more it can develop local production to meet demands previously satisfied by imports and, therefore, the larger would be the multiplier. Thus, the population variable can also act as a proxy for extent of import substitution.

Further modification of the naive version of the economic base theory is made by including in-migration and out-migration as explanatory variables in the employment change equation. It is hypothesized that in-migration and employment change are directly related. Since the migration data used in this study cover only employed members of the labor force, in-migration automatically corresponds to an increase in total employment by the number of in-migrants. However, there are other effects stemming from the initial in-migration that might lead to a further increase in total employment. As Greenwood argues, in-migration causes a shift outward not only in the labor supply function, but also in the labor demand function.[47] If the latter is greater than the former, and there are reasons to believe that it might be, then in-migration would result in an increase in employment on greater than a one-to-one basis. The reasons for an increase in demand for labor are the following. If in-migration into a region either causes the prices of domestically produced goods and services to go up or increases the marginal physical product of the locally supplied labor, then the derived demand for labor tends to increase in the destination region as a result of the in-migration. The former can be expected to occur because the new entrants into the community create an increase in

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[47] Greenwood (December, 1975), p. 801.

demand for the goods and services that they consume. The latter can occur if the in-migration induces more investment in the destination region. Therefore, if the in-migration is in response to already existing labor demand, then the combined influence of this and the above-mentioned factors would result in a multiple increase in employment for every new migrant into the region. The two-way relationship between in-migration and employment change has been discussed by several researchers. As mentioned, Greenwood has incorporated this into several simultaneous equations models of employment change and migration. Also, Muth and Olvey have included migration as an explanatory variable in their equations of employment change.[48,49]

Using the same argument in reverse, since out-migrants are employed workers, out-migration corresponds to a decline in the regional employment. If, in addition, the out-migration causes the derived demand for labor to decrease--by causing the prices of locally produced goods and services to fall and by inducing a decline in investment--then the net result could be a multiple decline in employment for every out-migrant to another region. Greenwood has used out-migration in his explanation of employment change.[50]

An employment change function that includes all these variables would be written as follows:

$$\underset{\sim}{DELE}_i = f(DELB_i, U_i DELB_i, POP_i DELB_i, IM_i, OM_i, u_3)$$

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[48] Muth (January, 1971), pp. 295-306.

[49] Olvey, pp. 139-163.

[50] Greenwood (December, 1975), pp. 797-810.

where:

$DELE_i$ is the employment change in county i between the first quarters of 1971 and 1973;

$DELB_i$ is the change in basic employment between the first quarters of 1971 and 1973;

U_iDELB_i is the product of county i's 1971 unemployment rate and $DELB_i$;

POP_iDELB_i is the product of county i's 1970 population and $DELB_i$;

IM_i is the number of in-migrants into county i between the first quarters of 1971 and 1973;

OM_i is the number of out-migrants from county i between the first quarters of 1971 and 1973; and

u_3 is an error term.

Summary

The theoretical model developed in this chapter attempts to explain the interaction between migration and employment change. The specification of the three equations to be estimated simultaneously is dictated somewhat by the form of the available data. The three dependent variables are the level of in-migration, the level of out-migration and employment change. Since it is hypothesized that migration and employment change both influence and are influenced by the other, these variables are also among the explanatory variables. The other independent variables are the change in basic employment, per capita income, population, rate of unemployment, education level, relative youth of the population and net entrants into the labor force. This model will be tested and analyzed in the following chapters.

CHAPTER IV

DATA SOURCES AND REGRESSION RESULTS

In this chapter the three-equation model will be specified. The data sources will be discussed, together with the exact definition of the dependent and explanatory variables. Several versions of the model will be tested. Explanatory variables will be added or dropped according to their performance.[1] The preferred model contains those variables that are significant and those that, based on economic theory, form the core of any model of migration. Lastly, the results of the regressions will be presented.

Model Specification

The model to be tested is composed of three equations. There is an employment change equation, an in-migration equation, and an out-migration equation. It is hypothesized that employment change and migration both explain, and are explained by, the other. A linear form is assumed for each of the three equations as specified below:

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[1] The performance of explanatory variables is judged by the significance of their coefficients. Significance at any given level, for any null hypothesis and a given number of degrees of freedom is determined by the value of the t-statistic. Thus, for a one-tail test, a significance level of 0.01, the null hypothesis that $B_0 = 0$ and degrees of freedom equal to 60, if the absolute value of the t-statistic is greater than 2.39, then the coefficient of any variable is significantly greater than zero.

$$DELE_i = a_0 + a_1\ DELB_i + a_2\ IM_i + a_3\ OM_i + \text{Error Term} \quad (1)$$

$$IM_i = b_0 + b_1\ DELE_i + b_2\ PCY_i + b_3\ POP_i + \text{Error Term} \quad (2)$$

$$OM_i = c_0 + c_1\ PYNG_i + c_2\ POP_i + c_3\ DELE_i + \text{Error Term} \quad (3)$$

where:

$DELE_i$ is employment change in county i;

$DELB_i$ is change in basic employment in county i;

IM_i is the number of in-migrants into county i;

OM_i is the number of out-migrants from county i;

PCY_i is the per capita income in county i;

POP_i is the population of county i;

$PYNG_i$ is the median age of county i's population; and

a_0, a_1, a_2, a_3, b_0, b_1, b_2, b_3, c_0, c_1, c_2, c_3 are all coefficients.

The following hypotheses are tested:

1. The basic employment multiplier is greater than one. That is, an increase in basic employment by 1 would increase total employment by more than 1 ($a_1 > 1$).
2. An increase in the number of in-migrants increases total employment by more than this number ($a_2 > 1$).
3. An increase in the number of out-migrants decreases total employment by more than this number ($a_3 < -1$).
4. A change in employment brings about a change in in-migration in the same direction ($b_1 > 0$).
5. A relatively high per capita income level attracts in-migrants to a region ($b_2 > 0$).
6. A relatively large population also attracts in-migrants to an area ($b_3 > 0$).

7. A region that has a relatively older population will experience less out-migration ($c_1 < 0$).
8. A relatively large population also results in greater out-migration ($c_2 > 0$).
9. A change in employment should result in a change in out-migration in the opposite direction ($c_3 < 0$).

Several other versions of the model were tested. In one version, the product of the unemployment rate and change in basic employment ($U_i DELB_i$) and the product of population size and change in basic employment ($POP_i DELB_i$) were included in equation (1). In other versions, the rate of unemployment (U_i) and net entrants into the labor force ($NENT_i$) were tried in the in- and out-migration equations in various combinations with the other variables. Also, an educational level variable (PED_i) and a distance variable ($DIST_i$) were tried in equation (3). The hypotheses tested were:

10. The higher the rate of unemployment, the larger will be the basic employment multiplier--the coefficient of $U_i DELB_i$ is positive.
11. The larger the population, the larger will be the basic employment multiplier--the coefficient of $POP_i DELB_i$ is positive.
12. A relatively high unemployment rate acts as a deterrent to in-migration--the coefficient of U_i in the IM_i equation is negative.
13. In-migration and net entrants into the labor force are inversely related--the coefficient of $NENT_i$ in the IM_i equation is negative.

14. A relatively high unemployment rate encourages out-migration--the coefficient of U_i in the OM_i equation is positive.
15. The greater the number of net entrants into the labor force, the greater will be the out-migration--the coefficient of $NENT_i$ in the OM_i equation is positive.
16. A relatively high level of educational achievement encourages out-migration--the coefficient of PED_i in the OM_i equation is positive.
17. The greater the distance from the nearest SMSA, the smaller is the out-migration--the coefficient of $DIST_i$ in the OM_i equation is negative.

The model was also tested using rates rather than levels of in-migration, employment change, net entrants into the labor force and out-migration. The rates were calculated by taking the value of each of these variables for the two-year period as a percentage of the initial labor force. In another version, natural logarithms of all the variables were used. Also, different definitions of PED_i and $PYNG_i$ were used.

The Variables and Their Data Sources

Data on all the variables used in this study had to be obtained for each of the 77 counties of Oklahoma. A major source was migration data assembled by the Bureau of Economic Analysis (BEA), Regional Economic Analysis Division, from the Social Security Continuous Work History Sample (CWHS). These data are described in detail in Appendix A.

Employment Change

The BEA data contain information on initial covered work force in the first quarter of 1971 and final covered work force in the first quarter of 1973 (see the Migration Summary Table, p. 134). This information is available for "All Males" and "All Females".[2] The total employment change between the first quarters of 1971 and 1973 is obtained for each county by subtracting the initial covered work force from the final covered work force and summing over the two sex groups. It is possible that the results may be biased by the failure to include the total labor force rather than only that covered by the Social Security Administration (SSA).[3] However, for this to occur, the migration behavior of unemployed workers, and those workers in self- or paid employment who are not covered, would have to be significantly different from that of the covered workers. There is no a priori reason for supposing this.

Change in Basic Employment

The data on change in basic employment are obtained from County Business Patterns (CPB).[4] For purposes of this study, basic employment has been defined as the number of people employed in mining, manufacturing and agriculture. Therefore, basic employment is calculated

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[2]"Migration Summary", (Washington, D.C., 1975).

[3]Almost 10 percent of the workers in paid employment are excluded from the social security system, including most Federal civil servants, some state and local government employees, certain domestic and agricultural workers, and certain employees of nonprofit organizations.

[4]U. S. Bureau of the Census, County Business Patterns, 1971, CBP-71-38, pp. 24-79; County Business Patterns, 1973, CBP-73-48, pp. 24-82.

as the sum of the total employment in these three sectors (the agricultural sector was taken to be the category "Agricultural Services, Forestry, Fisheries" in County Business Patterns) for 1971 and 1973 for each county. Since employment is reported as "Number of employees, mid-March pay period", these data are compatible with the first quarter BEA data. The difference between 1971 and 1973 basic employment yields the required change in basic employment. The reason for using CBP data instead of the CWHS data was the greater convenience of the former. The coverage under either is essentially identical.[5,6] However, in the case of the CWHS, the breakdown by industry is not available for total covered work force--only by migrant status. Therefore, for each county, aggregation would have had to be done over five different migrant and work force categories. Since the CBP coverage is supposedly the same, this source was used instead. The question then arises as to why the CBP employment change data were not used. Since BEA migration data were used, it was considered more appropriate to use BEA employment change data. As mentioned in the last chapter, the location quotient technique could have been used to calculate change in basic employment. However, the assumptions made about the similarity of household tastes and expenditure patterns in different regions and the use of non-homogeneous industrial groupings, cause the estimate of basic employment by this technique also to be an approximation.[7] Therefore, using this

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[5]U. S. Bureau of Economic Analysis, The Continuous Work History Sample, (Washington, D.C., September, 1975), pp. 5-6.

[6]U. S. Department of Commerce, County Business Patterns, CBP-71-39, p. 1.

[7]Hugh D. Nourse, Regional Economics (McGraw-Hill Book Company, 1968), pp. 151-154.

method to isolate basic employment would not necessarily lead to any better results than the method used in this study.

In-Migration

The total number of in-migrants between the first quarter of 1971 and the first quarter of 1973 is obtained from the BEA Migration Summary Tables.[8] This information is available for each county for two race groups, the two sex groups, and 13 age groups. It is also available in aggregate form for "All Males" and "All Females". Summing these two categories yields the total number of in-migrants during 1971-1973. In-migrants into county i are defined as those members of the covered work force whose county of employment changed from some other county to county i sometime between the first quarters of 1971 and 1973.

Out-Migration

Out-migrants from county i are similarly defined as those in the covered work force whose county of employment changed from county i to some other county between the first quarters of 1971 and 1973. Again, the BEA Migration Summary Tables contain the required information and summing across the two sex groups yields the total number of out-migrants from each county.[9]

Per Capita Income

The per capita income figures are obtained from the Survey of

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[8] "Migration Summary."

[9] Ibid.

Current Business.[10] Since income data by county are not available for 1970 or 1971, but are available for 1969 and 1972, the arithmetic average for these two years is used to approximate county per capita income in 1970-1971. The income data from the above source are in current dollars. Since the hypothesis to be tested is that counties with relatively higher incomes attract in-migrants, it is not necessary to use constant dollar income data. Thus, deflating to constant dollar figures would leave the relative rank of each county unchanged.

Population

The Census data on the April 1, 1970 population for each county are used as a proxy for county population in 1971.[11]

The Youthfulness of the Population

Data on this variable are again obtained from the 1970 Census.[12] The median age of the population of each county is used as a measure of the relative youthfulness of a region's population in 1971-1973. Another version of the variable is the fraction of total covered work force less than 45 years old, calculated from the BEA data, and is used in one set of computer runs.

Net Entrants

The BEA data is used to calculate the number of net entrants into

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[10] U. S. Bureau of Economic Analysis. Survey of Current Business, (Washington, D.C., 1975), p. 48.

[11] U. S. Bureau of the Census. 1970 Census of Population: Characteristics of the Population, (Washington, D.C., 1970), p. 17.

[12] Ibid., pp. 391-396.

the labor force in each county between the first quarter of 1971 and the first quarter of 1973.[13] The table on "Structure of Exits and Entrants" (p. 140) contains data on total exists from the labor force and total entrants into the labor force between the first quarters of 1971 and 1973. The difference between the two yields the total number of net entrants over the two-year period.

Unemployment

Data on the rate of unemployment are obtained from information published by the Oklahoma Employment Security Commission.[14] Unfortunately, unemployment data by county are only available for the total labor force--not just the social security covered labor force. Therefore, the 1971 unemployment rate of the total labor force (calculated by taking the total number of unemployed workers as a percentage of the total labor force) is used as an approximation to the unemployment rate among the covered work force.

Educational Achievement

Data on the educational level attained by a region's population is obtained from the 1970 Census.[15] The percentage of the above 25-years old population that had completed high school education or better is used as an indicator of relative educational achievement. This is

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[13] U. S. Bureau of Economic Analysis, Regional Economic Analysis Division, Structure of Exits and Entrants, (Washington, D.C., 1975).

[14] Oklahoma Employment Security Commission, Handbook of Oklahoma Employment Statistics, 1958-1973, (Oklahoma City, Oklahoma, 1973).

[15] U. S. Bureau of the Census. 1970 Census of Population: Characteristics of the Population, (Washington, D.C., 1970), pp. 391-396.

calculated for each county from the census data and used as a proxy for educational achievement in 1971. A different form of the variable--representing median years of schooling for each county--is also calculated from the same source and used in one set of computer runs.

Distance

The distance between each county and the nearest of three SMSAs (Tulsa, Oklahoma City, and Dallas) is measured as the straight-line distance from the approximate geographical center of the county to the closest of the three SMSAs. Road miles would be a better variable, but is was decided to compute this only if the distance variable performed reasonably well in preliminary runs.

Method of Estimation

> An econometric model has three aspects: its economic content, its mathematical structure, and its statistical properties . . . If the model is not in proper statistical form, it may turn out that the parameters cannot be uniquely estimated, even though adequate data are available. In the language of econometrics, the model may not be identified.[16]

The best method of estimating the parameters of a simultaneous equations system depends upon whether the model is under-, just-, or over-identified. If any one of the equations in the model is under- or over-identified, then the model itself is under- or over-identified. For the model to be just-identified, every equation in the model must be exactly identified. In the case of under-identification, the structural parameters cannot be estimated statistically regardless of the size or accuracy of the sample data. But, all parameters of an

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[16] M. J. Brennen, Preface to Econometrics (Cincinnati, Ohio, 1973), p. 384.

over-identified model can be estimated by better sample observations or longer computations. Therefore, only under-identification really constitutes a problem.

The necessary and sufficient conditions for identification are the order and rank conditions, respectively. The former states that an equation is over- or just-identified according as the number of variables excluded from it is greater than or equal to one less than the total number of endogenous variables in the entire model. The latter states that if there are "n" behavioral equations containing one or more endogenous variables each, then, it must be possible to construct at least one non-zero determinant of order (n-1) from the coefficients of the variables excluded from the equation in question but contained in the other n-1 behavioral equations.[17,18,19] In practice only the order condition can be determined, and it is used as the general criterion for identification of an equation.

Under-identification permits no estimation of the entire model by any statistical methods. Just-identified models are estimated by least-squares estimates of the reduced form. However, with over-identification there are too many relations between the reduced form and structural parameters, so that the structural parameters cannot be determined uniquely from knowledge of the reduced form parameters. Other statistical methods must be used.[20]

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[17] Jan Kmenta, Elements of Econometrics (New York, New York, 1971), pp. 539-550.

[18] Kong Chu, Principles of Econometrics (Scranton, PA, 1972), pp. 134-139.

[19] Brennan, pp. 384-410.

[20] Brennan, p. 398.

The choice of statistical method should be based upon how many of four particular characteristics are possessed by the estimators that it yields. The four common characteristics of a good estimator or sample statistic are: (1) unbiasedness, (2) consistency, (3) efficiency, and (4) sufficiency. In actual empirical research one must often be content with estimators that possess one or more of these properties, but not all of them. Unbiasedness and consistency are considered to be most important.

If the structural model is over-identified, application of least squares to each reduced form equation of the model cannot be used. Other estimation methods available are: (1) least-squares applied directly to the structural equations, (2) the method of instrumental variables, (3) two- or three-stage least squares, and (4) limited information or full information maximum likelihood. Although these methods will not be discussed in detail here, a brief rationale for the choice of two-stage least-squares follows. When some of the independent regression variables are also endogenous variables, then method (1) yields biased and inconsistent estimates. In method (2), the choice of variables selected as instrumental for each equation, is basically arbitrary. The computation of both limited and full information is very cumbersome. That leaves two- and three-stage least-squares. As pointed out by Brennan, "No obvious grounds have been established that would lead to an unambiguous preference for one (method) over all others."[21] Consequently, it was decided to use two-stage least-squares as the method of estimation.

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[21] Ibid., p. 440.

In two-stage least squares, an equation is written for each endogenous variable expressed as the dependent variable and all the exogenous variables of the system expressed as the explanatory variables. Direct least-squares is applied to each equation and the values of the endogenous variables predicted from all the exogenous variables of the system are then used, instead of the observed values, as the explanatory variables in the original equations. Direct least-squares is applied again to each equation, yielding the two-stage least squares estimates.

Regression Results

The three equations in the model were estimated simultaneously, using both ordinary least-squares analysis and two-stage least-squares analysis. The results for two versions of the model are presented in Tables XIV and XV. The ordinary least-squares (OLS) results are presented only as a comparison. Since, in theory, OLS estimates are biased and inconsistent, only the two-stage least-squares (2-SLS) results will be discussed in detail in the next chapter.

For each equation, the regression coefficients are presented togather with the t-statistic (whose value is a test of statistical significance), and the confidence level at which the coefficient is significantly different from zero. Since a sample size of 77 is fairly large, and since large sample tests of significance are the same for OLS and 2-SLS, it was considered appropriate to use the t-statistic as a measure of significance. The value of r-square (adjusted in the case of 2-SLS) is also presented for each equation.

As mentioned, several versions of the model were also estimated using the rates of in-migration and out-migration and the percentage

TABLE XIV

ORDINARY LEAST SQUARES AND TWO STAGE LEAST SQUARES ESTIMATES OF THE RELATIONSHIP BETWEEN EMPLOYMENT CHANGE, IN-MIGRATION AND OUT-MIGRATION

Ordinary Least Squares					Two-Stage Least Squares				
Dep. Var.	Indep. Var.	Regression Coefficient	T-statistic	Prob. > |T|	Dep. Var.	Indep. Var.	Regression Coefficient	T statistic	Prob. > |T|
DELE			adjusted r^2 = 0.989		DELE			adjusted r^2 = 0.986	
	Intercept	-150.634	-3.023	0.0035		Intercept	-37.304	-0.461	0.6461
	DELB	0.717	3.908	0.0002		DELB	1.222	3.469	0.0005
			(-1.544)*					(0.663)*	
	IM	1.328	25.572	0.0001		IM	1.804	10.735	0.0001
			(6.323)*					(4.785)*	
	OM	-0.947	-11.908	0.0001		OM	-1.655	-6.447	0.0001
			(0.660)**					(-2.55)**	
IM			adjusted r^2 = 0.994		IM			adjusted r^2 = 0.986	
	Intercept	-567.764	-1.378	0.1725		Intercept	-689.760	-1.580	0.1186
	DELE	0.677	12.295	0.0001		DELE	0.811	7.634	0.0001
			(-5.873)*					(-1.843)*	
	PCY	0.138	1.402	1.1653		PCY	0.170	1.626	0.1083
	POP	0.032	7.971	0.0001		POP	0.034	7.760	0.0001
	U	-8.042	-0.242	0.8097		U	0.807	0.023	0.9817
	NENT	0.149	0.839	0.4041		NENT	-0.140	-0.523	0.6026
OM			adjusted r^2 = 0.986		OM			adjusted r^2 = 0.986	
	Intercept	-707.735	-1.226	0.2241		Intercept	-779.476	-1.320	0.1911
	U	-33.743	-1.177	0.2432		U	-26.029	-0.861	0.3920
	PED	-2.249	-0.339	0.7356		PED	0.010	0.001	0.9989
	PYNG	21.759	2.306	0.0241		PYNG	20.729	2.138	0.0360
	POP	0.031	8.394	0.0001		POP	0.032	8.275	0.0001
	DELE	-0.217	-4.817	0.0001		DELE	-0.136	-1.528	0.1310
	NENT	1.076	7.298	0.0001		NENT	0.922	4.400	0.0001

*These numbers are the value of the T-statistic for H_0: B = 1.

**These numbers are the value of the T-statistic for H_0: B = -1.

TABLE XV

ORDINARY LEAST SQUARES AND TWO STAGE LEAST SQUARES ESTIMATES OF THE RELATIONSHIP BETWEEN EMPLOYMENT CHANGE, IN-MIGRATION AND OUT-MIGRATION WHEN U AND NENT ARE EXCLUDED FROM THE IM EQUATION AND U AND PED ARE EXLUDED FROM THE OM EQUATION

Ordinary Least Squares					Two-Stage Least Squares				
Dep. Var.	Indep. Var.	Regression Coefficient	T-statistic	Prob. > |T|	Dep. Var.	Indep. Var.	Regression Coefficient	T-statistic	Prob. > |T|
DELE			adjusted r^2 = 0.987		DELE			adjusted r^2 = 0.986	
	Intercept	-150.634	-3.0231	0.0035		Intercept	-27.760	-0.3254	0.7458
	DELB	0.717	3.9075	0.0002		DELB	1.277	3.5972	0.0006
			(-1.544)*					(.7798)*	
	IM	1.328	25.5718	0.0001		IM	1.846	10.2119	0.0001
			(6.323)*					(4.6790)*	
	OM	-0.947	-11.9084	0.0001		OM	-1.718	-6.2251	0.0001
			(0.660)**					(-2.6015)**	
IM			adjusted r^2 = 0.996		IM			adjusted r^2 = 0.986	
	Intercept	-682.116	-3.1759	0.0022		Intercept	-639.209	-3.0245	0.0034
	PCY	0.156	2.2488	0.0275		PCY	0.164	2.3366	0.0022
	POP	0.035	16.8043	0.0001		POP	0.033	12.1179	0.0001
	DELE	0.708	17.4151	0.0001		DELE	0.764	14.3988	0.0001
			(-7.186)*					(-4.458)*	
OM			adjusted r^2 = 0.985		OM			adjusted r^2 = 0.985	
	Intercept	-997.436	-2.9658	0.0041		Intercept	-915.702	-2.6049	0.0112
	POP	0.031	8.7596	0.0001		POP	0.032	8.6188	0.0001
	PYNG	23.455	2.6020	0.0112		PYNG	21.427	2.2813	0.0255
	NENT	1.066	7.2673	0.0001		NENT	0.905	4.3441	0.0001
	DELE	-0.213	-4.8221	0.0001		DELE	-0.134	-1.5805	0.1184

*These numbers are the value of the T-statistic for H_0: B = 1.

**These numbers are the value of the T-statistic for H_0: B = -1.

change in total and basic employment instead of the absolute size of these variables. The results were discouraging and seemed overly sensitive to definitional changes of the variables and to the inclusion or exclusion of various explanatory variables. Disappointing results were obtained also when the model was estimated using natural logarithms of the absolute size of these variables.

Some variables that were tried but are excluded from the results presented in Tables XIV and XV are discussed in the next chapter. The rationale for including them was discussed in the previous chapter.

Table XIV shows the results for a model in which employment change is explained by change in basic employment, in-migration, and out-migration; in-migration is explained by change in per capita income, population, the rate of unemployment and net entrants into the labor force; out-migration is explained by the rate of unemployment, the education level, median age, population, change in employment and net entrants.

In the employment change equation, using OLS analysis, the coefficient of change in basic employment has the expected sign and it is significantly greater than zero at the 0.01 level. However, the coefficient is not significantly greater than one. The in-migration coefficient has the expected positive sign, it is significantly greater than zero at the 0.01 level and it is also significantly greater than one at the 0.01 level. Out-migration has the expected negative sign, and its coefficient although significantly smaller than zero is not significantly smaller than one at the 0.01 level. Using 2-SLS analysis yields very similar results: a basic employment change coefficient that is positive and significantly greater than zero (at the 0.01 level)

but not significantly greater than one (at even a 0.1 level); an in-migration coefficient that is positive and significantly greater than both zero and one at a 0.01 level; and an out-migration coefficient that is negative and also significantly (at a 0.01 level) smaller than both zero and one. This last is the main difference between OLS and 2-SLS results. It is important that the three point estimators based on 2-SLS analysis are substantially larger than those yielded by OLS in this equation. This indicates the superiority of 2-SLS over OLS when the model is over-identified.

For the in-migration equation, OLS analysis yields an employment change coefficient that has the expected positive sign, and it is both significantly greater than zero and significantly smaller than one at a 0.01 level. The coefficient of per capita income is positive as expected but is not significant even at a 0.1 level. The population coefficient is also positive as expected and is significant at a 0.01 level. The unemployment rate coefficient has the expected negative sign but it is not significant. The net entrants coefficient does not have the postulated negative sign and it also lacks significance. Two-stage least-squares analysis, like OLS, yields an employment change coefficient that has the postulated positive sign. However, although it is significantly greater than zero, it is not significantly different from one at the 0.1 level. The coefficient of per capita income is positive and unlike the OLS results, it is significant at a 0.1 level. The population coefficient has the expected positive sign and is significant at a 0.01 level. The coefficient of the rate of unemployment does not have the expected negative sign, unlike the OLS results, and is not significant even at a 0.1 level as in the OLS case. The net

entrants coefficient has the postulated negative sign, unlike the OLS results, but again it is not significant at a 0.1 level.

Ordinary least-squares results for the out-migration equation are as follows. The unemployment rate coefficient does not have the expected positive sign, nor is it significant at a 0.1 level. The coefficient of educational achievement does not have the postulated positive sign and is not significant at a 0.1 level. The median age coefficient does not have the expected negative sign. The population coefficient has the expected positive sign and is significant at a 0.01 level. The employment change coefficient has the postulated negative sign and it is significant at a 0.01 level. The coefficient of net entrants has the postulated positive sign and is significant at a 0.01 level. Two-stage least-squares analysis again yields very similar results. The unemployment rate coefficient has the wrong sign and it is not significant. Although the coefficient of educational achievement does have the expected positive sign (unlike the OLS results) it is not significant. The median age coefficient has the wrong sign, though significant at a 0.05 level (as in the OLS results). The population coefficient again has the expected positive sign, and is significant at a 0.01 level. As in OLS analysis, the employment change variable has the right sign, but it is only significant at a 0.15 level. The coefficient of net entrants has the expected positive sign, like the OLS results, and it is significant at a 0.01 level. The adjusted r-square for all the equations, for both OLS and 2-SLS analysis, is very high. It ranges from 0.986 to 0.994.

Table XV shows the results for the preferred version of the model. Those explanatory variables that failed the test of significance are omitted in this version. The employment change equation contains

change in basic employment, the number of in-migrants and the number of out-migrants as the explanatory variables. The two interaction terms (UDELB and POPDELB) have been omitted. The amount of in-migration is explained by per capita income, population size and employment change. The unemployment rate and the net entrants variable have been dropped. Table XVI shows employment change and net entrants to be highly correlated with a simple correlation coefficient of 0.972. This, combined with the lack of significance of the net entrants coefficient, points to the existence of multi-collinearity and provides an additional reason for dropping the variable. The number of out-migrants is taken to be dependent on population size, the median age, the number of net entrants into the labor force and employment change. The unemployment rate and educational achievement have been omitted. They are seen to have a simple correlation coefficient of -0.69. Again, this combined with the lack of significance of their coefficients suggests multi-collinearity and provides another reason for excluding them.

The OLS results for the employment change equation are unchanged as expected since the equation itself is the same as in Table XIV. Although the absolute size of the coefficients is a little larger using 2-SLS analysis, their signs are unchanged, and the results are again essentially the same as in Table XIV.

The unemployment rate and the net entrants variables have been dropped from the in-migration equation. This causes the values of the OLS coefficients, though not their signs, to change a little, and the per capita income coefficient to become significant at the 0.05 level (where before it was not significant). The 2-SLS coefficients again have the same signs though they vary from those in Table XIV by a small

TABLE XVI

CORRELATION MATRIX

	DELE	IM	OM	U	POP	PED	PYNG	DELB	PCY	NENT
DELE	1.000									
IM	0.985	1.000								
OM	0.949	0.986	1.000							
U	-0.113	-0.135	-0.135	1.000						
POP	0.952	0.985	0.993	-0.125	1.000					
PED	0.279	0.341	0.368	-0.691	0.380	1.000				
PYNG	0.229	-0.270	-0.301	0.009	-0.345	-0.360	1.000			
DELB	0.840	0.868	0.897	0.007	0.883	0.249	-0.245	1.000		
PCY	0.214	0.255	0.263	-0.704	0.253	0.806	-0.023	0.178	1.000	
NENT	0.972	0.990	0.991	-0.115	0.987	0.331	-0.281	0.910	0.243	1.000

amount. However, now the coefficient of employment change is significantly different from both zero and one. As before, it is significantly greater than zero at a 0.01 level, but now it is also significantly smaller than one at a 0.01 level. Also, the per capita income coefficient is now significant at a 0.02 level instead of a 0.1 level.

The out-migration equation no longer has the unemployment rate and the educational achievement variables. In OLS analysis the values, though not the signs, of the coefficients are a little different from the Table XIV results. The median age coefficient still has the "wrong" sign but is now significant at a 0.01 level instead of a 0.02 level. The 2-SLS coefficients have the same signs, and substantially the same values, as those in Table XIV. The levels of significance of the various coefficients are also essentially the same.

The results for two other versions of the model are shown in Appendix C. Table XXIII is a variant of Table XV that has the two interaction terms UDELB and POPDELB in the employment change equation. Table XXIV is a variant of Table XIV that has a distance variable in the out-migration equation. Both tables show that the coefficients of the independent variables did not change much in the various trials.

The value of the adjusted r-square for the various equations lies between 0.985 and 0.987. The model in Table XV is preferred to the model in Table XIV and to other versions that were tried because all the included variables are significant. Variables that might theoretically have been expected to have a significant influence, but proved not to do so were dropped from the model. The exclusion of these variables does not alter the amount of the total variation that can be explained by the explanatory variables that have been retained

in Table XV. Two-stage least-squares analysis is preferred to OLS analysis for all the theoretical reasons discussed earlier in this chapter. Comparing the results of Tables XIV and XV again, it can be seen that under OLS analysis changes in the in- and out-migration equations leave the results of the employment change equation completely unaltered even though in- and out-migration are explanatory variables in the employment change equation. This, however, is not true of 2-SLS analysis. Also as mentioned earlier in the chapter, the coefficients yielded by 2-SLS analysis for the employment change equation are considerably larger than those obtained by OLS analysis. Two-stage least-squares analysis is, therefore, much superior to OLS analysis when the model is over-identified.

Summary

This chapter specified a basic three-equation migration and employment change model. The variables were defined and their data sources discussed. Several versions of the model were tested and the results of two of these were presented. These results will be analyzed and interpreted in the following chapter.

CHAPTER V

INTERPRETING THE RESULTS

The regression results set forth in the last chapter will be discussed and explained in detail in this chapter. Although both ordinary least-squares and two-stage least-squares results were tabulated, only the latter will be discussed. It was shown in the last chapter that of the two techniques, 2-SLS is preferred for the estimation of simultaneous-equations systems. The Table XV results will be discussed in detail, while some of the findings of the other models will also be explained.

The Employment Change Equation

Employment change is assumed to be a function of change in basic employment, total in-migration and total out-migration. Two other variables were also tried: the product of basic employment change and the unemployment rate, and the product of basic employment change and population size. However, these variables were excluded from the preferred model of Table XV, because their coefficients were not significant.

According to the export-base theory of regional growth, a change in basic employment should bring about a multiple change in total employment. Basic industries are the export-oriented industries, and employment in them is taken to be a function of external demand. An

increase in this demand would bring about a subsequent increase in employment and supply in the basic sector of the economy. This, in turn, should bring about an increase in internal or local demand, and if labor supply is not perfectly inelastic, the overall effect on employment turns out to be a multiple of the initial effect, which was an exogenous shift in the export demand.

The basic employment coefficient is positive and greater than one. The coefficient of 1.28 means that an increase in basic employment by one worker would bring about an increase in total employment by 1.28 workers. However, even though the coefficient is significantly greater than zero (at the 0.01 level; t-statistic = 3.597 for a one-tail test), it is not significantly greater than one (t-statistic = 0.78 for a one-tail test). This is not the expected result.

In seeking an explanation for this result, it must be remembered that the simplest version of the economic base theory is a rather naive attempt to explain variations in total employment. Researchers in this field have pointed out several serious shortcomings. One problem is "that the model assumes that there is sufficient excess capacity in the regional economy . . . some adjustment needs to be made for the degree of regional unemployment."[1] The average unemployment rate (the arithmetic mean of the rate for the 77 counties of Oklahoma) in 1971 was only 4.05 percent. Also, as mentioned later in this chapter, the unemployment rate was found to be insignificant in both the in-migration and the out-migration equations. Therefore, the low unemployment rate did not necessarily encourage in-migration or discourage out-migration.

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[1]Richardson, p. 13.

In this situation it is possible that the increase in basic employment resulted in an increase only in the price of non-export goods and services, and had no expansive effect on either employment or supply in this sector. However, when the product of the unemployment rate and change in basic employment was tried as an explanatory variable in the employment change equation, it was found to be insignificant. It seems, therefore, that the low unemployment rate cannot be used to explain the size of the basic employment multiplier.

Another problem with the economic base theory is that of import substitution. Again, as pointed out by Richardson, "Unless its rate can be predicted precisely, import substitution will play havoc with the parameters of the economic base model, particularly in the long run."[2] This is because "import substitution will have precisely the same impact upon the regional economy as an equivalent increase in exports."[3] A possible solution, according to Hoover, would be to classify all interregionally footloose industries as basic. This particular criticism points out how important it is that the "endogenous" and "exogenous" sectors be specified correctly. The method of assigning industries to these two sectors used in this study lacks a good deal in sophistication and was possibly responsible in some degree.

The most important reason for the size of the multiplier obtained in this study may be the empirical finding by Moody and Puffer "that the reaction time for transmitting impacts from basic to non-basic employment was very slow."[4] Also, "McNulty suggested that the economic

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[2]Ibid., p. 13.

[3]Hoover, p. 222.

[4]Richardson, p. 13.

base model worked well for periods of four years or longer, but performed very poorly over two-year periods."[5] The two-year period covered by this study may just not be long enough to get a reasonable estimate of the economic base multiplier. The shorter time period, however, does have some advantages in studying migration. For example, the longer the time period, the greater the number of multiple moves that would be reported as only one move.

Greenwood obtained a result somewhat similar to the one obtained here, in a slightly different context.[6] One of the 14 equations in his model of urban growth and migration relates changes in nonmanufacturing employment (used as a proxy for non-export sector employment) to changes in manufacturing employment (used as a proxy for export sector employment), in-migration, out-migration and several other variables. Greenwood obtained a coefficient of 0.092 for change in manufacturing employment.[7] However, this coefficient was not significant at a 0.1 level. He concludes:

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[5] Ibid., p. 13.

[6] Greenwood (December, 1975), p. 805.

[7] In Greenwood's analysis, each variable that related to a change is expressed as a rate. Further, all variables except the regional dummies are expressed as logarithms. However, the elasticities obtained in this study are directly comparable with those obtained by him, since rates and levels yield the same elasticities. This can be seen as follows:

The elasticity of the total employment change rate with respect to the basic employment change rate is:

$$\varepsilon = \frac{\frac{\Delta DELE}{POP}}{\frac{\Delta DELB}{POP}} \times \frac{\frac{DELB}{POP}}{\frac{DELE}{POP}} = \frac{\Delta DELE}{\Delta DELB} \times \frac{DELB}{DELE} =$$

the elasticity of the total employment change level with respect to the basic employment change level.

> As predicted by the export-base theory of urban growth, MANU has a positive sign in the NMANU equation for both time periods. However, the failure of MANU to appear significantly in either equation suggests that for cities in an advanced stage of development, increases in the export-base may not be contributing importantly to nonexport-oriented growth. Hence, adherence to a naive view of the export-base approach seems inappropriate.[8]

The conclusion with regard to the effect of changes in basic employment is that the predictive ability of the export-base approach can be modified by a number of factors. As mentioned, the most important of these in the current context, is probably the time-lag between cause and effect. The time required for a change in basic employment to have its full impact on total employment, is longer than the two-year period covered here.[9]

When all variables are expressed as natural logarithms, then the coefficients are the same as the elasticities. Thus, if

$$\ln DELER = a_0 + a_1 \ln DELBR \text{ where,}$$

$$DELER = \frac{DELE}{POP} \times 100 \text{ and } DELBR = \frac{DELB}{POP} \times 100$$

then differentiating both sides with respect to ln DELBR gives,

$$\frac{1}{\ln DELER} \times \frac{d \ln DELER}{d \ln DELBR} = a_1 \frac{1}{\ln DELBR} \quad \text{or}$$

$$a_1 = \frac{\ln DELBR}{\ln DELER} \times \frac{d \ln DELER}{d \ln DELBR},$$

which is the elasticity of the total employment change rate with respect to basic employment change rate. Therefore, the coefficients from Greenwood's study can be directly compared with the elasticities calculated in this study.

[8] Greenwood (December, 1975), p. 805.

[9] The reduced form multiplier was also calculated and found to have a value of -2.0. One would normally expect this to have a positive value somewhat larger than the simple economic base multiplier. This is because an increase in basic employment would not only lead directly to an increase in total employment, but also indirectly through the latter's positive impact on in-migration and its negative impact on out-migration. The reduced form multiplier is found to be the term:

$$\frac{a_1}{1 - b_1 a_2 - c_4 a_3}$$

The second variable used to explain the behavior of employment change is the level of in-migration. This variable is expected to be directly related to employment change and it has been argued that under certain conditions, a change in in-migration would result in a multiple change in employment.

The in-migration coefficient has a value of 1.846 in Table XV. It is both significantly greater than zero (at 0.01 level, t-value = 10.212), and significantly greater than one (at 0.01 level, with a t-value of 4.679). For every new in-migrant into a county, total employment increased by 1.846. However, since in-migrants are by definition employed, the induced increase in total employment is only 0.846. Calculated at the mean values of employment change and in-migration, this yields a point elasticity of employment change with respect to in-migration of 1.7. This compares with elasticities of 0.07, 0.039, and 0.257 for 1950-1960, and 0.142, 0.283, and 0.195 for 1960-1970, obtained by Greenwood for changes in manufacturing employment, government employment and nonmanufacturing employment, respectively, as a result of

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where a_1 is the coefficient of basic employment in the employment change equation, b_1 is the coefficient of employment change in the in-migration equation, c_4 is the coefficient of employment change in the out-migration equation and a_2 and a_3 are the coefficients of in- and out-migration in the employment-change equation. The estimated value of the reduced form multiplier is:

$$\frac{1.277}{1 - (0.764)(1.846) - (-0.134)(-1.718)} = -2.0.$$

It can be seen that the reason this system is unstable is that the value of b_1 is much larger than that of c_4, implying that a change in total employment has a much larger effect on in-migration than it does on out-migration.

a change in in-migration.[10] In another study, Greenwood obtains an elasticity of 0.412 for white employment change resulting from white in-migration and an elasticity of 0.385 for black employment change resulting from black in-migration.[11] In both studies, the coefficients are significant at a 0.1 level.

The result obtained in this study suggests that for inter-county migration in Oklahoma in 1971-1973, in-migration resulted in a rightward shift in both the labor supply curve and the labor demand curve, with the latter shift being dominant, such that total employment increased by a multiple (1.846) of new in-migration. The elasticity obtained here is much larger than those obtained by Greenwood, but the results are similar with regard to the significance of the in-migration variable. Thus, in-migration is significantly related to change in employment. The difference in elasticity is possibly due to the different contexts of the studies, and the difference in specification of the models. The geographical area covered is different, with the Greenwood studies covering national migration among the major SMSAs. The Greenwood models are more elaborate, containing 14 equations that are estimated simultaneously. His employment equations contain many more explanatory variables. Therefore, it is possible that the in-migration variable in this study is accounting for some of these other variables. But, it is also possible that the difference in elasticity is mostly due to the difference in the labor market response to in-migration in the two contexts.

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[10] The point elasticity calculated here is comparable with Greenwood's since his employment and migration variables are drawn from the total civilian labor force, whereas the BEA data is based only on the social security covered work force.

[11] Greenwood (1976), pp. 7-8.

The last variable used to explain employment change is the level of out-migration. It has been hypothesized that out-migration results in a decline in employment change. Also, it has been reasoned that if out-migration results in a decline in the price of domestically produced goods and services and/or a decline in investment, the labor demand curve might shift to the left at the same time as the labor supply curve, and the resulting decline in employment might be a multiple of the out-migration.

The coefficient for the out-migration variable in Table XV is -1.718. This is both significantly less than zero (at 0.01 level; t-statistic for a one-tail test = -6.225) and significantly less than one (at 0.01 level; t-statistic = -2.602). For every out-migrant from a county, total employment declined by 1.718. Again, since the out-migrants are by definition employed, the induced decline in total employment is 0.718. Calculated at the mean values of employment change and out-migration, this yields a point elasticity of employment change with respect to out-migration of -1.30. Greenwood obtained elasticities of 0.035, 0.046, and -0.134 for 1950-1960, and -0.223, -0.748, and -0.179 for 1960-1970 for changes in manufacturing, government and nonmanufacturing employment, respectively, as a result of changes in out-migration.[12] These were mostly significant at a 0.1 level. In his study of white and nonwhite migration, he obtained an elasticity of -0.504 for the former and -0.570 for the latter. Both were significant at a 0.01 level.[13]

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[12] Greenwood (December, 1975), p. 805.

[13] Greenwood (1976), pp. 7-8.

For intrastate migration in Oklahoma during 1971-1973, it appears that out-migration resulted in a multiple decline in total employment. Though the sign of the relationship is the same as that found by Greenwood in his studies, the elasticity is much greater than those obtained by Greenwood. The reasons for this are analogous to those for the difference in the case of the in-migration variable. In terms of significance, the fact that out-migration is found to be significantly related to a change in total employment, is consistent with Greenwood's finding for white and nonwhite migration.

Two other variables were also tried as mentioned in the previous chapter. The first one was the product of a change in basic employment and the rate of unemployment. It was hypothesized that a direct relationship exists between this variable and the change in total employment. The average unemployment rate (the arithmetic mean of the rate for the 77 counties of Oklahoma), in 1971 was only 4.05 percent. Also, as mentioned later in this chapter, the unemployment rate was found to be insignificant in both the in-migration and the out-migration equations. Therefore, the unemployment rate did not necessarily encourage in-migration or discourage out-migration. In this situation it is possible that the increase in demand generated by an increase in basic employment resulted in an increase only in the price of non-export goods and services, and had no expansive effect on either employment or supply in this sector. However, when the product of unemployment rate and a change in basic employment was tried as an explanatory variable in the employment change equation, it was found to be insignificant. The unemployment rate did not significantly reduce the size of

the basic employment multiplier.[14] This variable was subsequently omitted from the final version of the model.

The other variable that was tried was the product of county population and a change in basic employment. It was hypothesized that there is a direct relationship between this variable and a change in total employment. However, although the variable was found to be significant at a 0.01 level, its coefficient had a negative sign. Since this is hard to justify theoretically and since the inclusion of this variable resulted in a slight decline in significance of the basic employment change variable (from a 0.01 level to a 0.05 level), it was also omitted in the final version of the model.

Therefore, the conclusion is that during the time period covered, some labor market conditions were instrumental in determining employment growth at the county level in Oklahoma--both the migration variables were highly significant. However, neither the rate of unemployment nor the population size of the county modified the size of the basic employment change multiplier, which though positive was not significantly greater than one. The adjusted r-square obtained was very high: 0.986. Although high r-squares in combination with low t-values indicate

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[14]There is another possible explanation for the insignificance of the unemployment rate. This involves distinguishing between the current rate of unemployment and the long-term or equilibrium rate of unemployment. If the former is smaller than the latter for counties with relatively high current rates of unemployment, indicating a tighter labor market than in the past, it is possible that this would discourage local workers from migrating to areas with relatively lower current rates of unemployment. This would be reinforced if the areas with relatively lower current rates of unemployment were nevertheless experiencing higher current rates than their historical levels. Therefore, it may be that some of the nonmetropolitan counties though experiencing relatively higher current rates of unemployment than the metropolitan counties, had lower current rates than in the recent past and so did not lose as many workers as one might have expected.

serious multicollinearity, all three explanatory variables in the employment change equation are highly significant (have fairly large t-values). It is true that the simple correlation coefficient, for each pair of variables is very high (see Table XVI), but in view of the high level of significance of each variable, this is assumed not to be a serious shortcoming. Greenwood obtained r-squares of 0.78, 0.80, and 0.79 (1950-1960), 0.75, 0.59, and 0.83 (1960-1970) in one study,[15] and values of 0.795 and 0.750 in another study.[16] Although not quite as large as the r-square obtained in this study, these values are still very high.

The In-Migration Equation

In Table XV in-migration is shown to be a function of employment change, county per capita income and county population. It is hypothesized that an increase or decrease in employment will result in a corresponding increase or decrease in in-migration. Thus an area experiencing employment growth is likely to attract migrants from other regions. This is because the growth of employment is representative of expanding job opportunities and increasing labor demand.

The employment change coefficient has a value of 0.764 in Table XV. At the mean values of in-migration and employment change, this yields a point elasticity of 0.38. Therefore, during 1971-1973, those counties in Oklahoma that experienced employment growth also experienced in-migration. For every 10 new employees, there were 8 new migrants into the county. Another way of saying the same thing is that 8

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[15] Greenwood (December, 1975), p. 805.

[16] Greenwood (1976), pp. 7-8.

of every 10 new jobs went to migrants. This might be partly explained by the low unemployment rates during this period. However, as shown a little later, the rate of unemployment did not prove to be a significant determinant of the level of in-migration. It is interesting to note that the employment change coefficient is significantly smaller than one. Therefore, some of the newly created jobs do go to local workers.

Greenwood obtained elasticities for in-migration, with respect to employment change, of 3.280 and 2.517 (1950-1960), 3.895 and 0.477 (1960-1970);[17] 3.124 (white in-migration) and 2.545 (black in-migration).[18] All but one (0.477) of these were significant at the 0.1 level and some were also significant at the 0.01 level.

Miller found employment growth to be the most powerful variable in explaining both back in-migration and non-return in-migration.[19] He found that a growth of employment of 1 percent over 10 years produced an increase in back in-migration of 0.07 percent and an increase in non-return in-migration of 0.267 percent over five years. This is consistent with the result obtained here, with a 1 percent increase in employment growth bringing about a 0.4 percent increase in in-migration. The conclusion with regard to employment change is that in-migrants are indeed attracted by the availability of jobs and thus have a strong incentive to move to areas with rapidly growing employment.

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[17] Greenwood (December, 1975), p. 805.

[18] Greenwood (1976), pp. 7-8.

[19] Edward Miller, "Return and Non-Return In-Migration," Growth and Change: A Journal of Regional Development (January, 1975), pp. 3-9.

The per capita income of an area is expected to be directly related to in-migration. Potential migrants, in an attempt to maximize the present value of expected lifetime income, will move to those locations where this can be achieved. Insofar as a relatively high regional per capita income is indicative of more of the relatively well-paying occupations being situated in a particular area, one would expect such as area to attract more in-migrants.

The coefficient of per capita income in Table XV is 0.164. This is significant at a 0.02 level. At the mean values of per capita income and in-migration, this yields a point elasticity of 0.34. This means that a 1 percent increase in county annual per capita income (1 percent of $3100 = $31) brought about a 0.34 percent increase in in-migration (5 new in-migrants).

The findings of other researchers with respect to the effect of income on in-migration mostly point in one direction. Regional income differentials have a significant effect on the direction of migration. Some of the studies have found that destination-income variables provide a better explanation of migration than origin-income variables. That is, ". . . income (and job) opportunities provide a better explanation of in-migration than they do of out-migration."[20] But there is no consensus on this.

Many researchers have used migration from origin i to destination j as the dependent variable. Most of these have found regional income differentials to be a significant explanatory variable. Laber and Chase obtained this result for migration in Canada.[21] They found that

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[20]Greenwood (June, 1975), p. 400.

[21]Gene Laber and Richard X. Chase, p. 801.

in all the equations tested by them, the expected value of the earnings differential was significant at the 0.05 level or better.

Greenwood and Sweetland found that for inter-SMSA migration, the destination income variable had the expected positive sign and the origin income variable had the expected negative sign and all the coefficients were significant at better than the 0.01 level.[22] They found that a 1 percent increase in destination income increased in-migration by 0.54 percent. This is consistent with the point elasticity of 0.34 obtained in this study.[23] However, in keeping with the occasionally puzzling results generated by this variable, they found that when they disaggregated the data to calculate individual SMSA migration equations, 46 of 50 income elasticities failed to be significant at the 5 percent level. Their explanation for this was the high correlation between population and income with the result that population was picking up the effects of destination income. Greenwood and Gormely found that in a study of white and nonwhite interstate migration, the income variable (they used only the destination income) was positive for every state and failed to be significant at a 0.025 level for only 18 out of 48 states.[24,25] They state,

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[22]Michael J. Greenwood and Douglas Sweetland, pp. 665-681.

[23]Although the comparison is being made with a study that is an "origin and destination study", it is valid in this instance. The reason is that the income variable in the Greenwood and Sweetland study is not in the form of an income differential between the regions of origin and destination. Rather, the origin income and the destination income appear as separate variables. Therefore, a direct comparison between the elasticities from the two studies is quite valid.

[24]Michael J. Greenwood and P. J. Gormely, pp. 141-155.

[25]Although the Greenwood and Gormely study is also an origin and destination study, the comparison is valid for the same reason as in footnote 22.

> That the parameter estimates of the income variables are typically positive and significant indicates that income is indeed an important determinant of both white and nonwhite interstate migration.

Rural-urban income differentials have been found to be important in explaining the migration from rural to urban areas in many countries. Sahota obtained this result for migration in Brazil[26] and Toboli obtained the same result for migration in Libya.[27]

As for the performance of the income variable in in-migration equations, Greenwood obtained the expected positive sign on the coefficient of the income variable, but found the variable to have a significant influence only on 1960-1970 in-migration to both metropolitan and non-metropolitan areas (the elasticities were 0.043 and 0.101, respectively). It was not significant in 1950-1960 in-migration.[28] In his study of white and nonwhite migration, Greenwood found that both the income and the income growth variables were significant in explaining nonwhite in-migration, but not so in explaining white in-migration.[29] Miller found that median family income played a significant role in explaining non-return in-migration. In his regression, each $1000-increase in average family income produced an in-migration of 2 percent of the 1960 population over five years.[30]

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[26] Sahota, pp. 216-245.

[27] A. O. Toboli, "An Economic Analysis of Internal Migration in the Libyan Arab Republic," (unpublished Ph.D. dissertation, Oklahoma State University, 1976).

[28] Greenwood (December, 1975), p. 805.

[29] Greenwood (1976), pp. 7-8.

[30] Miller (1973), p. 8.

The conclusion, with respect to the income variable, is that it can be important in explaining the magnitude of in-migration. Although the findings of other studies have been somewhat mixed, the variable was found to be significant in this study.

It has been hypothesized that the larger the population of an area, the more migrants it will attract from other areas. Several reasons have been cited for the expected finding: (a) population serves as a proxy for job opportunities, (b) it may serve as a proxy for the number of past migrants settled in an area and transmitting information back home about the area, and (c) it is indicative of the urbanization amenities available in an area.

The coefficient of the population variable in Table XV is 0.033. It is highly significant, with a t-statistic of 7.834. At the mean values of the population and in-migration variables, this yields a point elasticity of 0.75. This means that a 1 percent increase in population brought about a 0.75 percent increase in in-migration.

For white and nonwhite population variables, Greenwood and Gormely obtained point elasticities of 0.598 and 0.529. "This, of course, suggests that migration increases less than in proportion to population size."[31] Their population coefficients had the expected positive sign and were significant at a 0.025 level for 46 out of 48 regressions. The result obtained in this study is consistent with the Greenwood and Gormely results. The conclusion is that destination region population size is a significant determinant of the direction and magnitude of in-migration, and that the response of in-migration to a change in population size is not significantly more than unitary elastic.

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[31]Michael J. Greenwood and P. J. Gormely, p. 151.

Several other variables were tried and dropped from the "preferred" model of Table XV. The results for these variables appear in Table XIV. One of the variables was net entrants into the labor force. It has been theorized that the number of in-migrants and the number of net entrants into the labor force should be inversely related.

The coefficient of the net entrants variable had the expected negative sign in 2-SLS analysis. However, it was not significant even at a 0.1 level. Greenwood does not use his "natural change of civilian labor force" as an explanatory variable in his in-migration equation. No other studies were found that used any variation of the net entrants variable as an independent variable in an in-migration equation. Therefore, no comparison could be made between the results of this and other studies. It was concluded that a natural change in the labor force brought about by a discrepancy between the number of entrants and exits, does not influence the magnitude of in-migration.

Another variable that was tried in several regressions and dropped was the rate of unemployment. This was found throughout to be insignificant and frequently carried the wrong sign.

The findings of other studies with regard to this variable are quite mixed, with the majority outcome being that it does not have significant explanatory power. It is expected that a high rate of unemployment will act as a deterrent to in-migration. Greenwood found both a change in white unemployment and the rate of white unemployment to be significant at a 0.1 level and with the expected sign. However, neither of the nonwhite counterparts was significant and one even had the wrong sign.[32] This led him to conclude that whites are more

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[32] Greenwood (1976), pp. 7-8.

responsive than nonwhites to job opportunities. In his other study, Greenwood found both unemployment change and the beginning-of-period unemployment rate to be significant, with the expected sign, for 1950-1960 migration, but not so for 1960-1970 migration.[33] Gallaway, Gilbert and Smith found the mean unemployment rate in a state to be significant, with the expected sign, at the aggregate level, but found it to be insignificant at the disaggregated state level.[34] They attributed its insignificance at the individual state level to the fewer degrees of freedom in the observations at that level. Other studies have obtained insignificant results and the wrong sign for the unemployment rate variable. In the single-equation studies this could perhaps be attributed to simultaneous-equations bias. But as observed in the case of the Greenwood studies, unemployment is not always found to be significant even in more complex simultaneous-equations models. Disaggregation of the data, such as by race, might yield more meaningful results. However, there is an alternate explanation of the results that might be valid in some cases. Thus, as documented by Greenwood in his survey article, Lansing and Mueller suggest that:

> . . . unemployment tends to be highest among the least mobile groups in the labor force--among persons in blue collar occupations, among those with low skill and educational levels, and among the young (presumably the very young, like 16 to 18 year olds) and the aged. Except for young persons entering the labor force (at, say, ages 19 and over), the unemployed tend to be workers who ordinarily would not consider migration as one of their options. Lansing and Mueller conclude that unemployment serves as a "push" factor that encourages persons to move if they are young, well-educated, and trained, or live in a small town.[35]

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[33] Greenwood (December, 1975), pp. 804-805.

[34] L. E. Gallaway, R. F. Gilbert, and P. E. Smith, pp. 211-223.

[35] Greenwood (June, 1975), p. 403.

In this study, since the unemployment rate variable did not perform as expected in either the in-migration or the out-migration equation, and since it was invariably insignificant, it was simply dropped from the final version of the model.

The r-square of 0.986 is very high. But, it is consistent with the r-squares obtained by other researchers who used an in-migration equation as one of several equations in a simultaneous-equations model. Greenwood obtained r-squares of 0.94 and 0.91 for 1950-1960, and 0.93 and 0.75 for 1960-1970, in his study of urban growth and migration.[36] In his study of white and nonwhite migration he obtained r-squares of 0.957 and 0.962.[37]

The Out-Migration Equation

Out-migration is taken to be a function of the relative youth of the population, the total population of a region, employment change, and net entrants into the labor force. In addition, some other variables were tried but excluded from the model in Table XV.

The first explanatory variable in the out-migration equation is the relative youth of the population. It is hypothesized that the younger the population of a county, the more out-migration will occur. Since older persons have a shorter expected working life over which to realize the advantages of migrating, the rate of return on migration, and therefore, the probability that a labor force member will migrate, is likely to decrease with age. Also, job security and family ties are likely to be more important for older persons than for younger ones,

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[36] Greenwood (December, 1975), p. 805.

[37] Greenwood (1976), pp. 7-8.

with the result that increased age acts as a further deterrent to migration.

In Table XV, the coefficient of PYNG (median age of the population) does not have the expected negative sign. However, the variable is significant at better than a .05 level. The coefficient magnitude of 21.427 means that every one year increase in the median age of a county's population resulted in an additional 21 people migrating out of that county.

The result obtained here is at variance with the findings of other studies. Greenwood used median age of SMSA population in his analysis of urban growth and migration. He found that increased age levels significantly discouraged out-migration to metropolitan areas in 1960-1970.[38] Gallaway found that,

> . . . in the case of geographic movement of workers an annual earnings differential of about $85 will be just sufficient to compensate a worker for the bundle of objective and subjective costs of movement associated with an additional year of age.[39]

There is, however, a possible explanation for the result obtained in this study. When the movements involved are relatively short-distance ones, from one county to another within the same state, or to the nearest counties in adjoining states, and involving a distance easily travelled by car, it is likely that age will not act as a deterrent to migration. In the data used here, a person is classified as a migrant if his county of employment changed during the time period covered. However, this does not mean that the migrant's county of residence changed also. Given the short distances under consideration

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[38]Greenwood (December, 1975), p. 805.

[39]Gallaway, p. 180.

here, it would probably be quite easy for a person to switch jobs and simply commute to a new job in another county. In a situation like this, the conventional deterrents to mobility that are associated with age would simply not be applicable. Thus, family ties need not be broken and since the monetary and non-monetary costs involved would be quite low, even a moderate return on the "migration" might suffice as an inducement.[40] Even if actual relocation to another county is required, these arguments would probably still apply. As a matter of fact, there are many individuals who own farms and live out in the country, and commute to jobs in either Tulsa or Oklahoma city. They do this either because they cannot make enough from agriculture, or because they simply prefer a more peaceful lifestyle. People who do this would presumably not consider it a big hardship to change their county of employment, since it probably would not involve a change in their county of residence.[41]

If the above analysis is correct, age and migration need not be expected to be inversely related. Under the given conditions it is difficult to say, a priori, what the expected sign would be on the age variable. It is possible that if the out-migration equation was estimated for different age groups, the hypothesized relationship between age and migration would still be found in the over-50 age groups.

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[40]It must be noted that although the monetary costs of commuting might have been relatively low in 1971-1973, this is no longer true and will become increasingly less so in the future. Therefore, extrapolation of this kind of behavior into the future would be unwise.

[41]Again, rising gasoline prices will modify this kind of behavior.

Another explanation is possible. The state of Oklahoma was a net loser of population through migration for several decades prior to the 1950s. The 1960s saw a reversal of this trend with a very small net gain. However, the in-migrants during this period were relatively older than out-migrants since the state is attractice to retirees. This combination of forces probably resulted in an increasing median age for many counties thus yielding a spurious statistical result where a greater age seems to cause more out-migration.

Interestingly, the conclusion about the age selectivity of migration arrived at in the descriptive analysis of Chapter II was opposite to that obtained here. Based on the data for six counties, it was concluded that the percentage migrating out of a county was greater for the under-30 age group than for the over-30 age group. However, when the regression was performed using the percentage of covered work force under 45 years of age instead of the county median age, the variable was found not to be significant. Therefore, obviously there were enough counties among the over 71 in which the relatively younger members of the work force were not significantly more migratory.

The second explanatory variable used in the out-migration equation is the total population of the county. The population size is expected to be directly related to magnitude of out-migration. Thus, the greater the population of a county, the greater the expected migration from it, just because it is likely to have a greater number of residents who have any given reason to migrate, including a larger migrant stock.

The coefficient of the population variable in Table XV has the expected positive sign and a value of 0.032. It is highly significant with a t-ratio of 8.62. Taking the mean values of population size and

out-migration, this yields a point elasticity of 0.79. This means that out-migration increased less than in proportion to an increase in the size of population.

Greenwood and Sweetland obtained point elasticities of 1.106 and 1.112.[42] These are somewhat higher than the result of this study. Miller, on the other hand, found that the larger the population of a state, the smaller would be the out-migration from it.[43] In fact this relationship emerges as very significant in his analysis. He reasoned that the larger the population of an area, the easier it would be to find the desired job within its boundaries, without having to move out of the state. He also controlled for variations in the propensity to migrate through the use of "percent born out of state", "the level of education", and "the logarithm of population" as independent variables. The divergence between his results and that obtained here may be explained by the difference in methodology--the fact that no specific attempt was made in this study to control for different propensities to migrate. However, the more important reason is probably the difference in the geographical scope of the studies. The probability of finding the desired job within the boundaries of a given region is much smaller when that region is a county rather than a state. In this case, counties with larger populations will probably experience greater out-migration for the reasons discussed earlier. The conclusion with regard to the population variable is that it can have a significant effect on the magnitude of out-migration.

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[42]Michael J. Greenwood and Douglas Sweetland, pp. 670-672.

[43]Miller, pp. 396-405.

The next variable used to explain out-migration is employment change. It is hypothesized that this will be inversely related to out-migration. The growth of employment has here been taken to be a proxy for the expansion of job opportunities in an area and is expected to reflect growing labor demand. Therefore, an increase in employment is expected to bring about a decline in out-migration, and vice versa.

The coefficient of the employment change variable is -0.134 in Table XV. It has the expected negative sign and it is just significant at a 0.1 level. This result is not out of line with that obtained by Miller. He found employment growth to be the most important variable in explaining out-migration. He claims that it is necessary to control for the population in jeopardy of migrating, in order to get an unbiased result for the effect of employment growth on out-migration. Greenwood found that his employment growth variable had the expected negative sign in each of four cases, and was significant at better than a 0.1 level in three of them.[44] However, in his study of white and nonwhite migration and urban change, he found that a change in both white and nonwhite employment had the expected negative sign in the out-migration equation but was not significant.[45]

Although the employment change coefficient is seen to be just marginally significant in Table XV, with a point elasticity of 0.07, the conclusion is that it can have an important effect on out-migration. The fact that employment change was found to be highly significant in the in-migration equation, and is less so in the out-migration equation,

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[44]Greenwood (December, 1975), p. 805.

[45]Greenwood (1976), pp. 7-8.

may reflect the fact that origin-region characteristics are not as important in explaining migration as are destination region characteristics. But one can conclude that employment growth can act as somewhat of a deterrent to out-migration.

The last variable used to explain out-migration in the model specification of Table XV, is net entrants into the labor force. It has been hypothesized that the greater the number of net entrants, the greater will be the out-migration, unless the demand curve for labor is perfectly elastic. Thus, the greater the natural increase in the labor force of a region due to net entrants into the labor force, the greater will be the excess supply of labor in that region and, therefore, the greater will be the out-migration from it.

The coefficient of NENT has the expected positive sign and it is highly significant with a value of 0.995 and a t-ratio of 4.344. At the mean value of net entrants and the number of out-migrants, this yields a point elasticity of 0.42.

As in the case of in-migration, this result could not be compared with others in the literature on migration, since none of the studies that were consulted used any version of this variable in the explanation of out-migration. The conclusion with regard to this variable is that a change in the number of net entrants into the labor force has a significant effect on out-migration, and in the same direction.

Several other variables were tested for their contribution to the explanation of variations in out-migration. One of these was the rate of unemployment. The performance of this variable was disappointing and, for the reasons mentioned in the analysis of in-migration, it was excluded from the final version of the model shown in Table XV.

Another variable that was tried and rejected was the educational achievement of the labor force. It has been hypothesized that the more educated the labor force, the greater will be the out-migration from a region. Employment information and job opportunities are expected to increase with increased education and, therefore, so is migration. Also,

> . . . education may reduce the importance of tradition and family ties and increase the individual's awareness of other localities, with the consequence that the forces that hold him to his present locality are weakened.[46]

There is another rather interesting argument for including education in the out-migration equation. As Greenwood states:

> The greater the improvement in the education . . . the greater the expected increase in labor productivity, and hence the greater the anticipated increase in the derived demand for labor. To the extent that the employment of additional highly productive workers results in the displacement of less-productive workers, and to the extent that these less-productive workers are unable to locate new jobs in their present locality, a decrease in product demand occurs. Since decreased product demand tends to result in decreased product prices . . . the value of labor's marginal product tends to fall . . . Hence, effects on the consumption side of the market may to some degree offset increased factor demand that results from increased labor productivity. Note, however, that if after a reasonable period of search displaced less-productive workers are unable to locate new jobs in their present locality, they would presumably migrate out. Thus, the out-migration variables should in part reflect the effects of such occurrences.[47]

On the basis of this reasoning it can be hypothesized that an increase in educational level might lead to increased out-migration of both the better educated and the less educated.

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[46] Greenwood (June, 1975), p. 403.

[47] Greenwood (1976), p. 5.

Theoretically, and in accordance with the findings of some of the other studies, a case could be made for education as an explanatory variable in the in-migration equation also. However, when this was tried, the education variable did not perform well. In fact, this variable did not perform well in the out-migration equation either. Thus, in Table XIV, the coefficient of the education variable has the expected sign, but it is not significant at a 0.1 level.

This result seems to be contrary to the findings of many other studies. Greenwood found education to be highly significant in explaining white out-migration, but insignificant in explaining nonwhite out-migration.[48] He also found that higher levels of education resulted in significantly greater out-migration during 1950-1960, but not so in 1960-1970.[49] Suval and Hamilton conclude that,

> Migrant populations include proportionally more of the better educated persons than nonmigrant populations regardless of age, sex, color, or direction of movement to and from the South and its divisions.[50]

There might be a logical explanation for the result obtained in this study. All the studies mentioned above were either national in scope, or covered fairly large geographical areas. In contrast, this study is concerned with mostly short distance migration. It is possible that greater education does not bring about an observable increase in migration when the distances involved are relatively short. That this is a reasonable possible explanation is borne out by the findings of some other researchers. Schwartz found that within a

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[48] Ibid., p. 5.

[49] Greenwood (December, 1975), pp. 804-805.

[50] Elizabeth M. Suval and C. Horace Hamilton, p. 536.

given age group the deterring effect of distance declined substantially with education.[51] Folger and Nam concluded that the poorly-educated are almost as likely to be involved in a short-dirance move as the well-educated, but that the well-educated are much more likely to be involved in a long-distance move.[52] Suval and Hamilton, in studying migration to and from the South, found that, ". . . the apparent correlation between educational attainment and migration becomes more pronounced as distance of migration increases."[53] Therefore, since the markets for the better-educated are more national in scope than those for the poorly-educated, while education helps to decrease some of the information costs of migrating over long distance, it is probably not an important factor in short-distance moves.

A distance variable was tried to see if during the time period covered, a relatively shorter distance from the nearest of three SMSAs (Tulsa, Oklahoma City, and Dallas), encouraged out-migration from each county. Distance was not found to be a significant determinant of out-migration. This result is at variance with that obtained by other studies. These studies hypothesized and found an inverse relationship between distance and migration based on the argument that,

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[51]Schwartz, pp. 1153-1169.

[52]J. K. Folger and C. B. Nam, Education of the American Population, 1960 Census Monograph, prepared in cooperation with the Social Science Research Council. Washington, D.C.: U.S.G.P.O. for U. S. Bureau of the Census, 1967.

[53]Elizabeth M. Suval and C. Horace Hamilton, p. 546.

> . . . an important determinant of migration is the cost of moving, which has a money and a non-money component. The money component is the transportation costs _____. The non-money costs of migration are psychic costs _____. Such costs are likely to vary directly with the distance from a person's home.[54]

The anticipated relationship has been found by Greenwood,[55] Greenwood and Sweetland,[56] Greenwood and Gormely,[57] and Laber and Chase,[58] among others.

One possible reason for the result obtained in this study is the short distances involved and the definition of the migration variable. A migrant is someone who changes his county of employment. Since, with the relatively short distances involved, this does not mean that he will necessarily change his county of residence, and even if he does, since he would still probably be a resident of the same or an adjoining state, some of the psychic and information cost elements of distance are not applicable. In this situation it is not surprising to find that distance is not a significant determinant of migration. This variable was omitted from the model of Table XV.

The r-square for the out-migration equation is 0.986. This is very large, but is consistent with Greenwood's results for his out-migration equation. He obtained r-squares of 0.89, 0.83, 0.85, and 0.73 in one study and r-squares of 0.954 and 0.961 in another study.[59,60]

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[54] Michael J. Greenwood and P. J. Gormely, pp. 144-147.

[55] Greenwood (May, 1969), p. 191.

[56] Michael J. Greenwood and Douglas Sweetland, p. 671.

[57] Michael J. Greenwood and P. J. Gormely, p. 147.

[58] Gene Laber and Richard X. Chase, p. 801.

[59] Greenwood (December, 1975), p. 805.

[60] Greenwood (1976), pp. 7-8.

Summary

One of the two versions of the model that were tested and discussed in the last chapter has been chosen as the preferred one, and the results have been discussed and interpreted in this chapter. The conclusion is that within the context of this study, employment change and migration are simultaneously determined. In the explanation of employment change, a change in basic employment, the magnitude of in-migration and that of out-migration, all play a significant role, the first two exerting a direct influence and the third being inversely related. The magnitude of in-migration is significantly influenced by employment change, the regional per capita income and the population size, all three being directly related to the dependent variable. Out-migration is significantly affected by the relative youth of the population, population size and the number of net entrants. Employment change is found to be marginally significant in explaining the variations in out-migration. Population size, net entrants and county median age all influence out-migration directly, while employment change is inversely related to out-migration.

CHAPTER VI

CONCLUSION AND POLICY IMPLICATIONS

This study has had two main goals. One goal was to determine the main causes of migration in Oklahoma. The other goal was to see what effect migration had on the labor market situation, specifically, on employment growth. The BEA migration data that were used are not origin and destination data. For each county, the total number of in- and out-migrants was known but not their origin or destination. It was seen in Chapter I that the majority of in- and out-migration was from and to other counties of Oklahoma and its adjoining states. It was also inferred that most of the migration to or from adjoining states involved the counties nearest to the state boundary of Oklahoma. Therefore, this study has been one of relatively short distance migration. This chapter will briefly review the main conclusions of the study and then consider its policy implications.

A theoretical model was built, consisting of three equations to be estimated simultaneously. These were an employment change equation, an in-migration equation and an out-migration equation. Several hypotheses were tested. Only the variables that contributed significantly to the explanation of the variation in each dependent variable were retained in the final version of the model.

For explaining employment change, it was hypothesized that in-migration should be directly related to it, out-migration should be

inversely related and that a change in basic employment would have a multiple effect on employment change in the same direction. It was also theorized that the larger the population, the greater would be the basic employment multiplier, and that the smaller the unemployment rate, the smaller would be this multiplier.

The levels of in- and out-migration were both found to be highly significant. Therefore, migration is an important determinant of total employment change. The basic employment change multiplier was found to be not significantly greater than one. It was concluded that apart from the fact that the economic base theory is too simplistic, the probable explanation for the too-small size of the multiplier was the short time period covered. Other researchers suggest that the time-lag between initial impact and eventual change in total employment is considerably longer than 2-3 years.

For explaining the level of in-migration, it was hypothesized that several "pull" factors are responsible. Thus, the regional per capita income is expected to exert a strong pull on potential in-migrants. Population size and total employment change are both expected to be directly related to in-migration. Net entrants into the labor force are expected to act as a deterrent to in-migration, as is a high rate of unemployment.

It was found that per capita income is indeed a significant attractive force. So are population size and employment change. However, the rate of unemployment was not significant--a conclusion that is corroborated by the findings of other studies. Net entrants into the labor force also was not a significant determinant of in-migration.

The level of out-migration is expected to be influenced by a set of "push" factors. The greater the number of relatively young people

in the work force, the greater it is hypothesized will be the out-migration. Population size and net entrants into the labor force are both expected to encourage out-migration, while total employment increase is supposed to discourage out-migration. The higher the rate of unemployment, the more people would be expected to migrate out. A relatively higher level of educational accomplishment should lead to greater out-migration.

Population size and net entrants were found to play the expected roles. Both were positively related to out-migration and were highly significant. The median age of the population, though significant, had the opposite relationship to that which was expected. It is concluded that when relatively short distances are involved, age does not exert an important negative force on migration. Also the large amount of net out-migration from Oklahoma before the 1960s might have led to an aging of the remaining population, thus resulting in a spurious relationship between age and out-migration. Employment change was found to be inversely related as hypothesized, but it was not as highly significant as the other three variables. As with in-migration, the rate of unemployment was not a significant determinant of out-migration. The educational level also was not significant. As previously mentioned, several researchers have suggested that education has an important influence only as the distance involved becomes longer. Therefore, one would not expect relatively short distance migration to be significantly influenced by this variable.

Policy Implications

Several important implications emerge from the above analysis for the policymaker. One follows from the conclusion that the simple

economic base model is an imperfect theory upon which to base regional development policies. Not only is there a considerable time lag between a change in basic employment and a subsequent change in total employment, but several other variables have an important influence on the eventual outcome. The labor market situation, especially the impact of in- and out-migration are seen to be important determinants of total employment change. The first implication is that regions experiencing large amounts of out-migration can suffer significant declines in total employment. Since rural-to-urban migration in Oklahoma has passed its peak, the prospect for large losses through out-migration from the nonmetropolitan areas has diminished. However, the point is that policymakers might sometimes consciously try to stem out-migration from certain areas as a means of preventing a decline in the level of economic activity in those areas. This is especially so since out-migration can sometimes be selective of the most able and energetic members of the labor force. Whether or not this policy is actually implemented will depend upon the other alternatives available to achieve regional goals. Further discussion will come later in this section.

The really important aspect of the effects of in- and out-migration on employment change is the magnitude of the effects. In-migration is seen to result in a multiple increase in total employment, whereas out-migration results in a multiple decline in total employment. The implication is that in-migration not only causes the supply curve of labor to shift to the right, it also shifts the demand curve outward and encourages increased capital investment and thereby results in a multiple increase in total employment. Out-migration results in an initial leftward shift of the labor supply curve and thereafter to a

leftward shift in the labor demand curve and to a decline in capital investment, so that total employment decreases by a multiple of the initial out-migration. The magnitude of these effects should be of interest to the policymaker when trying to determine whether continuing in-migration to urban areas will create infrastructure problems in those areas, or whether encouraging out-migration from rural areas is the best way of alleviating the problems of those areas. The results of this study imply that in-migration may lead to increased capital investment in the destination region and out-migration may lead to a decline in capital investment in the origin region. These are important implications for the policymaker. The issue is largely unsettled. Thus, Richardson states,

> The argument that out-migration creates huge negative employment multiplier effects is unconvincing. The first-round effects tend to be neutral: either the unemployed migrate or the emigrants bequeath their jobs to the local unemployed. There are secondary effects due to the loss of expenditures by the unemployed, but these are relatively small.[1]

However, the results of this study certainly show that out-migration can lead to significant declines in employment, even though the negative employment multiplier obtained is not huge.

The second important policy implication of the study is that there can be considerable leakage in the trickle down of newly-created jobs to the local work force. Employment change was found to be a significant determinant of in-migration. Its coefficient was found to be significantly greater than zero and significantly smaller than one. It was concluded that for every 10 new employees, there were 8 new migrants

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[1] Richardson, p. 25.

into a county--or that 8 of every 10 new jobs went to in-migrants. This indicates that a policy of regional economic development to aid depressed regions might not be very effective. There has been much debate on whether jobs should be moved to people or people moved to jobs. This study's finding is that the former policy of creating new jobs in economically lagging areas might just attract new in-migrants to those jobs with the result that only a few of them end up being in the hands of the local poor.

Several other researchers have raised the question of "place prosperity" versus "people prosperity" and found results similar to the one obtained here. Mahoney states,

> Evaluating the results of economic development programs as an alternative to migration requires more than knowledge of the number of jobs created in the area. It requires knowledge about which regions gain, which regions lose, and the differences. Since we are concerned with the program's effect in alleviating rural poverty, we also have to know about individual gainers and losers. Merely assuming that the poor will benefit if average area incomes are increased can lead to faulty evaluation.
>
> The evidence of gains in employment from our present economic development programs, although sketchy, suggests that the gains for the poor have been small. This is not to say that the regional and area economic rehabilitation programs may not be justified on other grounds, but merely that they have had limited applicability in reducing poverty.[2]

Bender, Green and Campbell state,

> The specific question relates to the in-migration which accompanies industrialization, and whether it precludes participation by the poor in the growth industries.
>
> The policy implications are quite important. Regional subsidization of job creation for the immobile poor could be in the interest of national efficiency as well as equity. But the situation in each region must be

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[2] Mahoney, p. 10.

> carefully evaluated. Such regional subsidies may result in leakage of jobs to the nonpoor and failure to improve poverty conditions . . .
>
> The evidence of this study is conclusive that the job leakage to in-migrants is great enough to warrant serious consideration.[3]

Thus, policymakers need to give the evidence serious consideration, since regional development policies through job creation may turn out to be neither efficient nor equitable. Richardson states that,

> The out-migration approach is unpopular among policymakers. One argument against it is that migration is selective and/or cumulative . . . Other objections relate to externalities: migration into prosperous regions adds to congestion, raises property values, and rents, . . . and threatens the fiscal stability of reception communities . . . These objections are dubious . . .[4]

The general conclusion among economists seems to be that although "both out-migration of people and in-movement of industry may be stimulated to some extent by public policy", they must be supplemented by other programs.[5] Among the programs suggested are improved information on job vacancies and relocation assistance so as to increase the efficiency of migration, and expanded programs of human development so as to reduce the "debilitating effects" of out-migration on those left behind.[6]

A third implication of interest to policymakers is that "pull" factors seem to be more important in encouraging in-migration than "push" factors are in encouraging out-migration. Employment change is

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[3] L. D. Bender, B. L. Green, and R. R. Campbell, pp. 34-41.

[4] Richardson, p. 24.

[5] Eva Mueller and Jane Lean, p. 8.

[6] Ibid.

a highly significant explanatory variable in the in-migration equation, but it is only marginally significant in the out-migration equation with an absolute value of the coefficient that is only one-sixth the size of the employment change coefficient in the in-migration equation. The significance of the regional income variable in the in-migration equation also showed that in-migration is highly responsive to economic opportunities. In some preliminary runs, this variable was found not to be significant in the out-migration equation.

Other studies also have found that the pull forces are more important in influencing migration than are the push forces. Mueller and Lean state,

> Survey data suggest that even strong negative pressures--the 'push' exerted by exceptionally unsatisfactory economic conditions--are only moderately successful in inducing people to abandon a depressed area. The 'pull' provided by awareness of attractive opportunities elsewhere is crucial, whether we are concerned with depressed or more prosperous areas.
>
> Here, the point to be emphasized is that depressed areas experience a net loss of population not just because of out-migration but also, and primarily, because they attract fewer in-migrants than nondepressed areas. For instance, farm areas had by far the least in-migration rate, . . . compared with . . . urban and rural non-farm areas . . . To a large extent this difference explains the decline in rural population. It corroborates a general finding of our study that in-migration rates are more sensitive to economic conditions than are out-migration rates.[7]

Greenwood, in his survey of internal migration, states "A finding common to a number of gross migration studies is that income (and job) opportunities provide a better explanation of in-migration than they do of out-migration."[8]

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[7]Ibid.

[8]Greenwood (June, 1975), p. 400.

If it is accepted that "pull" factors are more important than "push" factors, then it may make sense for policymakers to use regional development policies as a means of attracting capable and qualified in-migrants to alleviate some of the problems of depressed areas. However, it must be remembered that these policies may do little directly to help the local poor.

A fourth implication is that age selectivity of migration is not something that is inevitable. Before taking age selectivity into account in their decision making, policymakers need to be aware that short-distance migration may not be youth selective. Thus, Richardson says that "the selective out-migration hypothesis has not been rigorously tested."[9]

As for Oklahoma, the best mix of regional policies will vary from region to region and from time to time. A detailed consideration of the issue of which sub-state policies to implement in any particular sub-state region, now or in the future, is beyond the scope of this study. In the discussion of goals it was stated that only the general policy implications would be considered.

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[9] Richardson, p. 24.

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APPENDIXES

APPENDIX A

THE BEA DATA

Much of the data used in this study was assembled by the Bureau of Economic Analysis (BEA), Regional Economic Analysis Division from the Social Security Continuous Work History Sample (CWHS). This appendix discusses various aspects of the BEA data.

The CWHS Sample[1]

Method of Compilation

The Social Security Administration receives quarterly reports from employers listing the employer's name, address, and identification number and each employee's name, social security number and taxable wages earned during the quarter. The 10-percent sample is extracted from this file and matched with an employee file created from the individual's application for a social security number, to pick up information on sex, race and date of birth. The resultant file is then matched to an employer file containing information on geographic location, industry of employment, and wages earned for each worker in the sample for each quarter of the year.

The CWHS is a fixed panel, non-rotating sample of individuals who hold specific social security numbers. Individuals are eligible for inclusion in the sample only if they receive wages reported under the social security program during the subject year. A stratified type of sample design is used to ensure the presence of data for all states.

Coverage

The OASDI system covers about 90 percent of persons in paid employment. There are two types of OASDI coverage: mandatory and elective. Mandatory coverage includes most employees in private nonfarm industries, certain farm employees, most domestic employees who work on a regular basis, and Federal employees not covered by the Federal Retirement System. Groups covered on elective basis, individually or jointly, consist of ministers, employees in nonprofit establishments, and state and local government workers.

The major groups of workers excluded from this file are (i) self-employed (OASDI does, however, maintain a file for this group from

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[1]This and the following section mostly consist of excerpts taken from D. Cartwright and K. Horowitz, Migration Data Assembled by the Bureau of Economic Analysis, Regional Economic Analysis Division, from the Social Security Continuous Work History Sample (Washington, 1973).

which a comparable 10 percent annual sample is selected and forwarded to BEA), (ii) most Federal, state and local civilian workers, (iii) employees of exempt non-profit organizations which do not elect coverage, (iv) ministers and members of religious orders who do not elect coverage and (v) railroad workers covered by the Railroad Retirement Act.

Wage Data Limitations

The major limitation of these data is that the employer reports only the wages up to the taxable limit. The Social Security Administration has, however, developed a procedure by which total wages are estimated from the quarterly pattern of taxable wages of each individual. This procedure, in essence, carries forward for the remainder of the year the quarterly earnings rate of the individual for the last full quarter before the taxable limit was reached.

Understatement of Mobility

A worker is classified as a migrant if the county of employment changed during the time period covered. No account is taken of the fact that some workers might have moved more than once during this time, leading to understatement of mobility in some cases.

The Migration Analysis Data System

As with most sources of data, the BEA data has some classification peculiarities which make it not immediately comparable with other series for certain categories. The CWHS is based on reports which the employer files quarterly with the Social Security Administration. The BEA constructs two types of files from the CWHS records: first quarter and annual.

The first quarter files contain records for all individuals in the sample who worked during the first quarter, with their first quarter wages expressed as an annual rate. This file is preferred to the annual file for migration analysis for several reasons:

(a) The first quarter file is more timely.

(b) The use of the first quarter file minimizes the errors in mean wage rates. Only taxable wages are reported to the Social Security Administration. For those individuals who reach the taxable limit during the year, the CWHS contains estimated wages for the rest of the year, based on the individual's wages in the preceding quarter. This introduces biases of unknown size and direction which can be minimized by using first quarter data. Almost all of the wages earned in the first quarter are taxable.

(c) The use of the first quarter file makes it possible to separate more precisely the wages before migration from the wages after migration. With annual data, the wages in the area of origin will include some wages from the area of destination. This can have the effect of biasing downward the estimated return to migration. This bias will occur with the first quarter file only when migration occurs during the first quarter. However, this source of bias tends to be small insofar as most migration occurs within the second and third quarters.

(d) Comparisons between CWHS employment estimates and other data series, such as County Business Patterns or decennial census data can be made more easily using first quarter rather than annual CWHS estimates. The CWHS measures the number of persons who worked during the given interval whereas the other series measure the number of persons working at a given point in time during the first quarter.

The annual file does have some advantages over the first quarter file:

(a) The preliminary first quarter file contains records for a large number of workers whose geographic location is unknown (approximately 3 percent of the individuals in the sample). This arises from the fact that an employer's quarterly report is often received and processed by Social Security before the information from that employer's application for an employer identification number has been posted to the employer file. This problem does not occur with the annual file.

(b) Certain industries which have a strong seasonal pattern of employment are likely to be under or overstated using quarterly data. This bias can be partially corrected using the annual file.

(c) The sampling variability is likely to be less with the annual file. Use of the first quarter data sacrifices the information on migration of individuals who did not work in the first quarter of both the beginning and terminal years of the period to be studied.

(d) The Bureau of Economic Analysis also receives from the Social Security Administration on an annual basis a 1 percent sample of self-employed persons, drawn on the same basis as the CWHS. It is, therefore, possible to incorporate into the annual file information for those persons who were self-employed.

However, due to data availability this study uses the first quarter files for 1971 and 1973. Two types of basic data files are constructed from the major job summary file: a "county summary file" and a "migration analysis file". The county summary file consists of the number of workers and aggregate wages for each county by sex, race, age,

industry and wage class. This file is used as input to work force structure tabulations. The "migration analysis file" is composed of records for each individual in the sample with work history information for more than a year.

Two types of tabulations have been made available from this data system for the first quarters of 1971 and 1973, for each county in Oklahoma: migration summary tabulations, and tabulations showing the structure of in-migrants, out-migrants, and non-migrants, and of entrants to and exits from the work force. These methods of classification will be further discussed.

For each type of tabulation, the data are classified by certain categories:

(i) All workers are classified by sex.

(ii) All workers are classified by race as negro or white. Workers reported as "unknown race" or "other race" are coded as white.

(iii) Workers are classified by age into 13 groups: Less than 19 years of age; 19-21; 22-24; 25-29; 30-34; 35-39; 40-44; 45-49; 50-54; 55-59; 60-64; 65-69; 70 and Older.

(iv) Workers are classified by 1- and 2-digit standard industrial classification. Thus the 1-digit SIC shows them as employed in one of ten industrial categories: agriculture; mining; contract construction; manufacturing; transportation, communication and public utilities; wholesale and retail trade; finance, insurance and real estate; services; government; or unclassified. The 2-digit SIC allocates workers to 34 industrial categories.

(v) Workers are also classified by wage class as having annual earnings of Under $2000; $2000-$2999; $3000-$3999; $4000-$4999; $5000-$5999; $6000-$6999; $7000-$7999; $8000-$8999; $9000-$9999; $10,000-$14,999; $15,000-$24,999; or $25,000 and Over.

Migration Summary

Table XVII is an example of this method of classifying the migration data. The migration summary tabulation presents estimates of the social security covered work force for each area of study with a classification of workers by migrant status during the period of study. This allows one to observe the changes in the work force due to migration, new entrants into and exits from that work force. Mean wages at the beginning and end of the time period are shown for each class of worker, allowing one to observe the relative wage gains or losses attributable to migration.

In-migrants are also classified by the state of origin, including, for Oklahoma, one category called in-migrants from rest-of-state. Similarly, out-migrants are classified by state of destination including out-migrants to rest-of-state. This type of table is available by county for each sex, race and age group.

The data contain an important military bias. They indicate that more workers are migrating from the military than are migrating to it. This is because the military is the first job for many young workers. When these workers leave the military (which has no geographic dimension) they are really new entrants into the civilian labor force but will appear as migrants to the area of study from the military.

TABLE XVII

MIGRATION SUMMARY BASED ON SOCIAL SECURITY CONTINUOUS WORK HISTORY SAMPLE (10%)

25 - 29 YEARS OF AGE

AREA - 73620 - POTTAWATOMIE, OK

	Thousands of Workers	% of Total	1971 Mean Wages	1973 Mean Wages	% Change Mean wages	Thousands of Workers	% of Total	1971 Mean Wages	1973 Mean Wages	% Change Mean wages
Initial Covered Work Force	.52	100.0	5,434			.46	100.0	3,822		
Immigrants	.19	36.5	6,124	7,079	15.6	.08	17.4	4,637	3,503	- 24.5
Out-migrants	.16	30.8	6,297	8,238	30.8	.16	34.8	3,530	4,215	19.4
Net Migration	.03	5.8				- .08	- 17.4			
Nonmigrants	.27	51.9	6,113	7,822	28.0	.20	43.5	4,396	5,045	14.8
Entered Covered Work Force	.10	19.2		3,555		.11	23.9		4,247	
Left Covered Work Force	.09	17.3	1,860			.10	21.7		4,503	
Final Covered Work Force	.56	107.7		6,808		.39	84.8		4,503	
Immigrants From:		100.0					100.0			
Rest of State	.19	100.0	6,124	7,079	15.6	.08	100.0	4,637	3,503	- 24.5
Outmigrants to:		100.0					100.0			
Rest of State	.13	81.3	6,310	6,880	9.0	.16	100.0	3,530	4,215	19.4
California	.03	18.8	6,240	14,119	126.3	.0	.0			.0

Far fewer workers will appear as migrants from the area of study to the military. For this reason the movements to and from "military and other" (which includes civilian workers whose geographic location is undetermined) are excluded from the migrant totals and shown as separate items.

Migrant Structure

Tables XVIII and XIX are an example of this type of classification. Table XVIII is a profile of the workers who migrated either into or out of the area of study sometime between the first quarter of 1971 and the first quarter of 1973. It shows the structure of those who migrated, in terms of sex, race, age, industry (1- and 2-digit SIC), and income class. Table XIX contains similar information for non-migrants--workers whose county of employment did not change between the first quarters of 1971 and 1973. This tabulation is of great help in studying the selectivity of migration. This method of classifying the data also helps in the examination of the results of migration--such as the economic return to migration.

Structure of Exits and Entrants

Table XX shows the third type of tabulation supplied by the BEA. It shows the structure of entrants into and exits from the covered work force between the first quarter of 1971 and 1973. As with migrants, exits and entrants are classified by sex, race, age, industry (1- and 2-digit SIC), and wage class.

TABLE XVIII

MIGRANT STRUCTURE BASED ON SOCIAL SECURITY CONTINUOUS WORK HISTORY SAMPLE (10%)
FIRST QUARTERS OF 1971 AND 1973

	OUT-MIGRANTS				IN-MIGRANTS			
	Thousands of Workers (1971)	% of Total	Mean Wages (1971)	Mean Wages (1973)	Thousands of Workers (1973)	% of Total	Mean Wages (1971)	Mean Wages (1973)
Total Migrants	1.92	100.0	4,058	5,509	1.67	100.0	4,953	5,450
White Males	1.11	57.8	4,584	6,412	1.21	72.5	5,513	6,238
Black Males	.08	4.2	4,205	4,998	.03	1.8	2,513	4,177
Other Males	.03	1.6	2,324	3,706	.03	1.8	4,620	3,700
White Females	.65	33.9	3,535	4,252	.39	23.4	3,370	3,321
Black Females	.05	2.6	2,341	3,692	.00	.0		
Other Females	.00	.0				1.8	7,229	2,170
Migrants by Age (1973)								
Less Than 19	.03	1.6	1,002	1,271	.03	1.8	301	1,610
19 - 21	.28	14.6	1,546	3,734	.17	10.2	1,655	3,071
22 - 24	.32	16.7	2,099	5,491	.24	14.4	2,431	4,360
25 - 29	.39	19.8	4,658	5,996	.41	24.6	5,082	6,001
30 - 34	.17	8.9	4,586	6,037	.17	10.2	6,307	5,833
35 - 39	.14	7.3	5,436	5,833	.20	12.0	6,588	6,456
40 - 44	.12	6.3	5,984	7,384	.12	7.2	7,558	7,292
45 - 49	.16	8.3	4,511	5,543	.12	7.2	5,904	5,500
50 - 54	.13	6.8	7,829	8,748	.08	4.8	6,246	7,025
55 - 59	.09	4.2	3,183	2,961	.05	3.0	4,144	4,571
60 - 64	.06	3.1	6,621	6,356	.05	3.0	6,339	6,403
65 - 69	.04	2.1	2,934	1,982	.04	2.4	5,767	1,552
70 and Over	.03	1.6	12,315	672	.00	.0		
Unclassified Age	.00	.0			.03	1.8	6,000	6,595
Median Age		29.3				29.8		

TABLE XVIII (Continued)

	OUT-MIGRANTS				IN-MIGRANTS			
	Thousands of Workers (1971)	% of Total	Mean Wages (1971)	Mean Wages (1973)	Thousands of Workers (1973)	% of Total	Mean Wages (1971)	Mean Wages (1973)
Migrants by 1-Digit SIC *								
Agriculture	.08	4.2	2,060	3,921	.03	1.8	5,310	6,289
Mining	.06	3.1	2,882	4,936	.03	1.8	6,198	8,792
Contract Construction	.35	18.2	4,771	5,799	.43	25.7	4,816	5,655
Manufacturing	.25	13.0	4,309	5,950	.19	11.4	4,602	5,949
Trans Comm, & Public Utils.	.04	2.1	4,755	4,839	.08	4.8	6,339	8,100
Wholesale & Retail Trade	.58	30.2	3,309	5,105	.32	19.2	4,355	4,346
Finance, Insurance & Real Est.	.12	6.3	5,175	5,835	.11	6.6	6,099	7,501
Services	.40	20.8	4,171	5,659	.43	25.7	4,892	4,526
Government	.03	1.6	5,040	7,434	.04	2.4	6,524	5,816
Migrants by Wage Class *								
Under $2,000	.69	35.9	872	3,506	.28	16.8	2,976	822
$2,000-$2,999	.19	9.9	2,510	4,045	.22	13.2	3,979	2,322
$3,000-$3,999	.24	12.5	3,553	4,809	.21	12.6	4,090	3,508
$4,000-$4,999	.16	8.3	4,420	6,186	.15	9.0	3,539	4,535
$5,000-$5,999	.15	7.8	5,375	6,563	.17	10.2	4,964	5,619
$6,000-$6,999	.16	8.3	6,400	5,968	.13	7.8	4,622	6,627
$7,000-$7,999	.06	3.1	7,773	7,602	.15	9.0	4,867	7,427
$8,000-$8,999	.04	2.1	8,428	8,160	.09	5.4	5,914	8,569
$9,000-$9,999	.10	5.2	9,420	9,698	.06	3.6	7,499	9,308
$10,000-$14,999	.13	6.8	12,129	11,948	.19	11.4	9,651	12,293
$15,000-$24,999	.00	.0			.03	1.8	9,124	17,370
Median Wage		3,333				4,833		

TABLE XIX

NON-MIGRANT STRUCTURE BASED ON SOCIAL SECURITY CONTINUOUS WORK HISTORY SAMPLE (10%)
FIRST QUARTERS OF 1971 AND 1973

	NON-MIGRANTS, 1971				NON-MIGRANTS, 1973			
	Thousands of Workers (1971)	% of Total	Mean Wages (1971)	Mean Wages (1973)	Thousands of Workers (1973)	% of Total	Mean Wages (1971)	Mean Wages (1973)
Total Non-migrants	4.59	100.0	5,078	6,061	4.59	100.0	5,078	6,061
White Males	2.17	47.3	6,340	7,748	2.17	47.3	6,340	7,748
Black Males	.11	2.4	4,763	5,006	.11	2.4	4,763	5,006
Other Males	.11	2.4	4,116	5,001	.11	2.4	4,116	5,001
White Females	2.13	46.4	3,946	4,548	2.13	46.4	3,946	4,548
Black Females	.05	1.1	2,355	3,484	.05	1.1	2,355	3,484
Non-migrants by Age (1973)								
Less Than 19	.05	1.1	679	1,769	.05	1.1	679	1,769
19 - 21	.20	4.4	1,503	4,420	.20	4.4	1,503	4,420
22 - 24	.29	6.3	2,113	4,334	.29	6.3	2,113	4,334
25 - 29	.53	11.5	5,295	6,466	.53	11.5	2,295	6,466
30 - 34	.43	9.4	5,279	6,328	.43	9.4	5,279	6,328
35 - 39	.43	9.4	5,796	6,993	.43	9.4	5,796	6,993
40 - 44	.45	9.8	5,805	6,842	.45	9.8	5,805	6,842
45 - 49	.46	10.0	5,982	6,760	.46	10.0	5,982	6,760
50 - 54	.61	13.3	5,935	6,849	.61	13.3	5,935	6,849
55 - 59	.33	7.2	5,257	5,892	.33	7.2	5,257	5,892
60 - 64	.44	9.6	5,609	5,936	.44	9.6	5,609	5,936
65 - 69	.29	6.3	4,564	4,098	.29	6.3	4,564	4,098
70 and Over	.08	1.7	3,535	4,065	.08	1.7	3,535	4,065
Median Age		44.1				44.1		

TABLE XIX (Continued)

	NON-MIGRANTS, 1971				NON-MIGRANTS, 1973			
	Thousands of Workers (1971)	% of Total	Mean Wages (1971)	Mean Wages (1973)	Thousands of Workers (1973)	% of Total	Mean Wages (1971)	Mean Wages (1973)
Non-Migrants by 1-Digit SIC *								
Agriculture	.11	2.4	3,368	4,080	.06	1.3	4,158	4,087
Mining	.11	2.4	4,755	5,166	.10	2.2	4,730	5,182
Contract Construction	.16	3.5	6,148	7,441	.19	4.1	5,429	6,776
Manufacturing	.47	10.2	5,404	6,162	.52	11.3	4,951	6,394
Trans Comm, & Public Utils.	.33	7.2	6,424	7,996	.31	6.8	6,559	7,899
Wholesale & Retail Trade	1.29	28.1	3,877	4,902	1.15	25.1	4,196	4,881
Finance, Insurance & Real Est.	.26	5.7	6,973	8,483	.22	4.8	7,420	10,012
Services	1.68	36.6	5,431	6,236	1.82	39.7	5,251	5,945
Government	.18	3.9	4,637	5,961	.19	4.1	4,092	5,792
Unclassified	.00	.0			.03	.7	5,186	8,669
Non-Migrants by Wage Class								
Under $2,000	.84	18.3	1,096	2,912	.57	12.4	2,196	1,056
$2,000-$2,999	.56	12.2	2,503	3,311	.50	10.9	2,621	2,541
$3,000-$3,999	.64	13.9	3,472	4,200	.49	10.7	2,802	3,489
$4,000-$4,999	.60	13.1	4,425	4,961	.55	12.0	3,393	4,589
$5,000-$5,999	.43	9.4	5,470	6,453	.48	10.5	4,354	5,434
$6,000-$6,999	.49	10.7	6,499	7,520	.42	9.2	5,231	6,501
$7,000-$7,999	.35	7.6	7,412	7,771	.51	11.1	6,130	7,440
$8,000-$8,999	.26	5.7	8,378	9,018	.42	9.3	6,859	8,406
$9,000-$9,999	.14	3.1	9,481	10,911	.15	3.3	8,353	9,422
$10,000-$14,999	1.8	3.9	11,822	11,843	.34	7.4	9,090	11,634
$15,000-$24,999	.06	1.3	18,976	20,141	.11	2.4	12,998	17,878
$25,000 and Over	.04	.9	30,175	36,600	.05	1.1	28,820	34,320

TABLE XX

STRUCTURE OF EXITS AND ENTRANTS BASED ON SOCIAL SECURITY CONTINUOUS WORK HISTORY SAMPLE (10%) FIRST QUARTERS OF 1971 AND 1973

	EXITS			ENTRANTS		
	Thousands of Workers (1971)	% of Total	Mean Wages (1971)	Thousands of Workers (1973)	% of Total	Mean Wages (1973)
Total Exits or Entrants	2.02	100.0	3,139	2.52	100.0	2,805
White Males	1.04	51.5	3,756	1.10	43.7	3,094
Black Males	.01	.4	3,466	.02	.7	2,709
Other Males	.05	2.5	2,062	.07	2.8	1,793
White Females	.82	40.6	2,494	1.30	51.6	2,769
Black Females	.04	2.0	2,688	.03	1.2	811
Other Females	.06	3.0	2,403	.00	.0	
Exits and Entrants by age (1973)						
Less Than 19	.13	6.4	418	.56	22.2	1,037
19 - 21	.16	7.9	862	.47	18.7	2,387
22 - 24	.13	6.4	3,032	.32	12.7	3,350
25 - 29	.21	10.4	2,556	.24	9.5	3,592
30 - 34	.18	8.9	4,041	.18	7.1	3,158
35 - 39	.22	10.9	3,946	.20	7.9	4,069
40 - 44	.17	8.4	3,004	.14	5.6	3,587
45 - 49	.16	7.9	3,869	.10	4.0	3,744
50 - 54	.11	5.4	3,178	.08	3.2	7,210
55 - 59	.13	6.4	4,431	.07	2.8	3,974
60 - 64	.19	9.4	3,541	.08	3.2	2,245
65 - 69	.16	7.9	4,451	.06	2.4	2,077
70 and Over	.07	3.5	2,593	.03	1.2	747
Median Age		39.5			24.2	

TABLE XX (Continued)

	EXITS			ENTRANTS		
	Thousands of Workers (1971)	% of Total	Mean Wages (1971)	Thousands of Workers (1973)	% of Total	Mean Wages (1973)
Exits and Entrants by 1-Digit SIC *						
Agriculture	.05	2.5	5,946	.07	2.8	1,364
Mining	.06	3.0	1,561	.03	1.2	3,290
Contract Construction	.19	9.4	5,444	1.24	9.5	2,742
Manufacturing	.24	11.9	3,889	.24	9.5	2,753
Trans Comm, & Public Utils.	.06	3.0	3,637	.00	.0	
Wholesale & Retail Trade	.70	34.7	2,061	.87	34.5	1,939
Finance, Insurance & Real Est.	.09	4.5	5,142	.14	5.6	4,843
Services	.56	27.7	2,851	.82	32.5	3,371
Government	.07	3.5	3,739	.06	2.4	3,884
Unclassified		.0		.03	1.2	1,315
Exits and Entrants by Wage Class						
Under $2,000	.89	44.1	798	1.26	50.0	780
$2,000-$2,999	.34	16.8	2,535	.29	11.5	2,457
$3,000-$3,999	.26	12.9	3,440	.33	13.1	3,452
$4,000-$4,999	.14	6.9	4,525	.19	7.5	4,509
$5,000-$5,999	.12	5.9	5,286	.17	6.7	5,396
$6,000-$6,999	.09	4.5	6,362	.13	5.2	6,574
$7,000-$7,999	.06	3.0	7,305	.06	2.4	7,283
$8,000-$8,999	.06	3.0	8,459	.06	2.4	8,438
$10,000 and Over	.03	1.5	12,200	.03	1.2	13,306
$25,000 and Over	.03	1.5	28,100	.03	1.2	43,200
edian Wage		2,353			2,000	

APPENDIX B

TABULATION OF COUNTY MEDIAN AGE

1950-1970

TABLE XXI

IN-MIGRATION AND OUT-MIGRATION PERCENTAGES FOR MIGRATION IN OKLAHOMA

County	In-Migration From:		Out-Migration To:	
	The Rest of Oklahoma	The Rest of Oklahoma and Adjoining States	The Rest of Oklahoma	The Rest of Oklahoma and Adjoining States
Adair	17	100	57	86
Alfalfa	100	100	75	75
Atoka	50	100	50	50
Beaver	33	100	50	100
Beckham	67	100	30	70
Blaine	70	82	67	67
Bryan	23	87	31	94
Caddo	69	85	64	84
Canadian	63	85	82	87
Carter	60	84	65	84
Cherokee	100	100	82	91
Choctaw	33	33	20	80
Cimarron	50	100	0	100
Cleveland	58	77	68	88
Coal	50	100	--	---
Comanche	51	75	45	71
Cotton	100	100	60	100
Craig	74	100	86	100
Creek	72	88	80	89
Custer	80	90	73	96
Delaware	20	60	46	55
Dewey	100	100	67	100
Ellis	50	75	75	100
Garfield	57	89	58	86
Garvin	70	85	60	87
Grady	80	100	62	80
Grant	100	100	80	100
Greer	40	100	67	100

TABLE XXI (Continued)

County	In-Migration From:		Out-Migration To:	
	The Rest of Oklahoma	The Rest of Oklahoma and Adjoining States	The Rest of Oklahoma	The Rest of Oklahoma and Adjoining States
Harmon	0	0	33	100
Harper	25	75	50	75
Haskell	100	100	67	83
Hughes	84	100	75	100
Jackson	40	80	56	94
Jefferson	100	100	100	100
Johnston	100	100	100	100
Kay	48	80	40	56
Kingfisher	71	86	84	92
Kiowa	80	100	78	100
Latimer	60	80	73	84
Le Flore	43	93	48	86
Lincoln	87	100	88	100
Logan	65	82	80	100
Love	29	57	50	100
McClain	56	67	75	75
McCurtain	45	78	17	97
McIntosh	0	0	100	100
Major	33	67	67	100
Marshall	33	83	25	50
Mayes	78	85	50	75
Murray	40	78	83	100
Muskogee	57	80	61	89
Noble	62	92	25	75
Nowata	100	100	17	50
Okfuskee	80	80	80	80
Oklahoma	40	65	49	71
Okmulgee	80	100	71	80
Osage	67	92	85	100
Ottawa	18	73	31	84
Pawnee	17	50	36	45
Payne	55	78	60	76

TABLE XXI (Continued)

County	In-Migration From:		Out-Migration To:	
	The Rest of Oklahoma	The Rest of Oklahoma and Adjoining States	The Rest of Oklahoma	The Rest of Oklahoma and Adjoining States
Pittsburg	53	70	39	82
Pontotoc	56	85	66	85
Pottawatomie	70	88	63	79
Pushmataha	100	100	100	100
Roger Mills	---	---	---	---
Rogers	83	94	93	93
Seminole	73	95	67	71
Sequoyah	75	100	57	100
Stephens	67	85	55	78
Texas	15	81	37	93
Tillman	50	75	75	100
Tulsa	29	56	33	66
Wagoner	60	100	60	60
Washington	42	83	44	72
Washita	50	67	40	100
Woods	40	67	69	100
Woodward	55	93	75	100

Source: Bureau of Economic Analysis, Regional Economic Analysis Division, Migration Summary (September, 1975).

TABLE XXII

MEDIAN AGE OF POPULATION BY COUNTY IN OKLAHOMA 1950-1970

County	1950	1960	1970	County	1950	1960	1970
Adair	25.8	29.5	29.7	Jackson	31.2	25.4	24.8
Alfalfa	33.7	40.5	43.3	Jefferson	30.7	40.3	42.8
Atoka	24.3	32.8	32.8	Johnston	28.3	35.0	35.8
Beaver	29.1	31.0	34.2	Kay	30.6	31.7	34.0
Beckham	30.4	35.1	40.5	Kingfisher	31.0	34.9	32.1
Blaine	29.7	35.2	36.0	Kiowa	30.6	36.5	40.9
Bryan	28.4	34.9	33.5	Latimer	27.4	34.1	30.0
Caddo	27.4	31.8	31.4	Le Flore	26.6	33.8	32.7
Canadian	29.0	30.1	28.0	Lincoln	30.7	35.5	35.8
Carter	30.4	32.5	34.6	Logan	30.9	34.2	31.9
Cherokee	24.1	25.0	24.8	Love	28.3	35.7	36.4
Choctaw	27.7	36.5	35.9	McClain	27.9	31.4	32.3
Cimarron	26.6	27.9	31.1	McCurtain	25.1	30.0	29.6
Cleveland	25.7	25.3	23.9	McIntosh	24.8	32.7	36.7
Coal	28.9	38.1	38.0	Major	29.2	36.4	36.3
Comanche	25.4	23.0	22.7	Marshall	31.0	37.8	42.2
Cotton	29.6	35.6	38.0	Mayes	28.5	31.7	33.5
Craig	36.5	40.0	39.0	Murray	33.0	36.3	38.5
Creek	29.4	31.4	30.3	Muskogee	29.9	32.4	32.2
Custer	28.9	29.7	26.0	Noble	32.2	35.4	35.7
Delaware	29.1	35.4	36.5	Nowata	31.2	34.5	37.9
Dewey	29.5	38.8	40.8	Okfuskee	26.9	34.5	35.3
Ellis	31.3	38.7	40.6	Oklahoma	29.4	28.4	27.7
Garfield	28.9	30.2	30.2	Okmulgee	28.4	32.5	33.1
Garvin	28.5	31.1	36.5	Osage	29.6	31.1	34.1
Grady	29.7	33.5	33.4	Ottawa	28.6	32.7	32.0
Grant	33.6	39.6	42.6	Pawnee	30.9	37.3	38.7
Greer	30.3	39.5	42.9	Payne	24.7	24.5	23.7
Harmon	29.2	35.5	40.1	Pittsburg	29.5	35.1	33.2
Harper	29.2	29.9	35.7	Pontotoc	29.3	32.8	33.9
Haskell	25.6	34.7	34.8	Pottawatomie	29.9	32.6	32.8
Hughes	29.0	37.9	41.9	Pushmataha	27.8	36.4	36.2

TABLE XXII (Continued)

County	1950	1960	1970	County	1950	1960	1970
Roger Mills	28.1	36.3	39.7	Tillman	29.5	33.9	34.5
Rogers	29.5	30.7	29.8	Tulsa	29.8	28.9	28.3
Seminole	27.8	32.9	36.5	Wagoner	26.0	29.8	29.0
Sequoyah	23.5	28.4	27.9	Washington	30.1	29.1	32.5
Stephens	28.8	30.9	35.6	Washita	29.3	28.3	37.0
Texas	27.0	26.8	26.4	Woods	29.3	34.0	32.1
				Woodward	33.2	35.4	32.7

Source: U. S. Bureau of the Census, 1960 Census of the Population: Characteristics of the Population, Part 38, Table 27; 1970 Census of the Population: Characteristics of the Population, Part 38, Table 35.

APPENDIX C

SUPPLEMENTARY REGRESSION RESULTS

TABLE XXIII

TWO-STAGE LEAST SQUARES ESTIMATES OF THE RELATIONSHIP BETWEEN EMPLOYMENT CHANGE, IN-MIGRATION AND OUT-MIGRATION WHEN TWO INTERACTION TERMS ARE INCLUDED IN THE EMPLOYMENT CHANGE EQUATION

Dep. Var.	Indep. Vars.	Two-Stage Least Squares: Regression Coefficient	T-Statistic	Prob. > |T|
DELE				Adjusted r^2 = 0.985
	Intercept	-286.385	-1.470	0.1460
	DELB	2.818	1.930 (1.244)*	0.0578
	IM	2.477	5.750 (3.428)*	0.0001
	OM	-2.162	-3.899 (-2.095)**	0.0002
	UDELB	-0.053	-0.216	0.8294
	POPDELB	-0.00001	-2.531	0.0136
IM				Adjusted r^2 = 0.986
	Intercept	-659.107	-3.024	0.0034
	DELE	0.764	14.444 (-4.468)*	0.0001
	PCY	0.169	2.337	0.0222
	POP	0.033	12.146	0.0001
OM				Adjusted r^2 = 0.985
	Intercept	-918.787	-2.620	0.0107
	PYNG	21.504	2.294	0.0247
	POP	0.032	8.630	0.0001
	DELE	-0.137	-1.637	0.1061
	NENT	0.911	4.413	0.0001

*These numbers are the value of the T-statistic for H_0: B = 1.

**This number is the value of the T-statistic for H_0: B = -1.

TABLE XXIV

TWO-STAGE LEAST SQUARES ESTIMATES OF THE RELATIONSHIP BETWEEN EMPLOYMENT CHANGE, IN-MIGRATION AND OUT-MIGRATION WHEN A DISTANCE VARIABLE IS INCLUDED IN THE OUT-MIGRATION EQUATION

Dep. Var.	Indep. Vars.	Two-Stage Least Squares: Regression Coefficient	T-Statistic	Prob. > |T|
DELE				Adjusted r^2 = 0.985
	Intercept	-169.054	-3.291	0.0015
	DELB	0.718	3.849	0.0003
			(-1.514)*	
	IM	1.324	25.170	0.0001
			(6.166)*	
	OM	-0.942	-11.680	0.0001
			(0.721)**	
	IMSMSA	195.613	0.976	0.3324
IM				Adjusted r^2 = 0.985
	Intercept	-653.029	-2.925	0.0046
	DELE	0.733	12.665	0.0001
			(-4.614)*	
	PCY	0.163	2.292	0.0249
	POP	0.032	7.913	0.0001
	NENT	0.057	0.314	0.7547
OM				Adjusted r^2 = 0.984
	Intercept	-1235.904	-2.977	0.0040
	PED	2.777	0.617	0.5390
	PYNG	24.996	2.696	0.0088
	POP	0.032	8.132	0.0001
	DELE	-0.230	-4.894	0.0001
	NENT	1.083	7.080	0.0001
	DIST	0.689	0.794	0.4299

*These numbers are the value of the T-statistic for H_0: B = 1.

**This number is the value of the T-statistic for H_0: B = -1.

VITA[2]

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