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The Metropolitan-Nonmetropolitan Turnaround in the Pacific States (California, Oregon, and Washington): Labor Migration Flows and Economic Deconcentration

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THE METROPOLITAN-NONMETROPOLITAN TURNAROUND IN THE PACIFIC STATES (CALIFORNIA, OREGON, AND WASHINGTON): LABOR MIGRATION FLOWS AND ECONOMIC DECONCENTRATION

by

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

AN ABSTRACT OF THE DISSERTATION OF Beverly Marie McLean for the Doctor of Philosophy in Urban Studies presented March 4, 1989.

Title: The Metropolitan-Nonmetropolitan Turnaround in the Pacific States (California, Oregon, and Washington): Labor Migration Flows and Economic Deconcentration.

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This dissertation examines the turnaround of labor force migration patterns in the states of California, Oregon, and Washington in the 1970s. The focus of the

dissertation is the simultaneous phenomena of economic deconcentration and employment migration in nonmetropolitan counties during the turnaround period.

The theoretical approach of the research draws from the disciplines of economics, geography, and sociology to develop a model that addresses what attributes of areas attract labor migration flows. The study specifies that labor migration is a function of economic activities, the environment, and accessibility.

The research focus is the role that economic and noneconomic factors play in attracting labor migration flows. The spatial focus is the counties in the states of California, Oregon, and Washington. The temporal focus of study is the period between 1965 and 1975.

The results of the research affirm the complexity of migration modelling. A test of equality of coefficients of the different periods investigated show significant differences between the turnaround and preturnaround models. The data results show just a few of the noneconomic factors are a major determinant of the nonmetropolitan turnaround.

The model results show several unexpected results. Several of the coefficients in the models have the opposite sign of what originally was expected. Another unexpected outcome of the research is the apparent symmetry of labor in-migration and labor out-migration coefficients. A formal

test for symmetry, however, shows the models are significantly different.

This study finds that the economic deconcentration process in the Pacific states is not one in which metropolitan growth spilled over into the nonmetropolitan counties. Rather both the metropolitan and nonmetropolitan counties simultaneously experienced deindustrializing (a decline of manufacturing employment and growth of service employment). The service related employment activity has a major influence on employment growth in the Pacific states. Although employment change does not show a significant influence on labor migration flows, labor migration does show a significant influence on employment growth in several of the model results.

CHAPTER I

INTRODUCTION

This study examines the change in labor force migration patterns and its interrelationship with economic deconcentration of jobs in the states of California, Oregon, and Washington. In particular, the focus is on the simultaneous phenomenon of economic migration and employment deconcentration in nonmetropolitan counties in the 1970s.

The focus of this study is on one aspect of population exchange, the migration of employed persons. Employed migrants play a significant role in population exchange between geographic regions. Studies by the U.S. Census Bureau show that 54.5% of all U.S. population moves between and within states are members of the civilian labor force when they move (Roseman, 1983). Of these migrants, 85.8% were employed when they move.

The temporal focus of this study is the period between 1965 and 1975. This period is selected because of the resurgence of population growth in U.S. nonmetropolitan counties in the 1970s. Demographic studies show that a decline in migration flows to U.S. metropolitan regions actually began to occur in the late 1960s (Beale, 1976; Brown & Wardwell, 1980). Population estimates for counties

by the U.S. Census Bureau for the years between 1960 to 1965 show that metropolitan counties gained more migrants than the nonmetropolitan counties gained. By 1969, it became apparent to demographers that a historical reversal in U.S. population flows started to happen (Beale, 1976; Brown & Wardwell, 1980).

The spatial focus of this study is labor flows between metropolitan statistical areas and nonmetropolitan counties in the Pacific states of California, Oregon, and Washington (see Figures 1, 2, and 3). Metropolitan statistical areas are those metropolitan counties having a population of 100,000 and a central city of 50,000 in 1970 as defined by the U.S. Census Bureau. A metropolitan statistical area may consist of one or more counties. This study categorizes metropolitan statistical areas by whether its population is greater than 500,000 or not. Nonmetropolitan counties are thus a residual category, not metropolitan. Nonmetropolitan counties are classified by whether the county is spatially influenced by the larger metropolitan statistical areas. Large metropolitan influence is based on whether the county is adjacent and not separated by physical barriers from a large metropolitan statistical area. It is assumed adjacent counties have a higher incident of spatial interaction (i.e., commuting to work and shopping) with metropolitan areas than do nonadjacent counties. Table I lists the names of the individual counties by their county type for each of the three states.

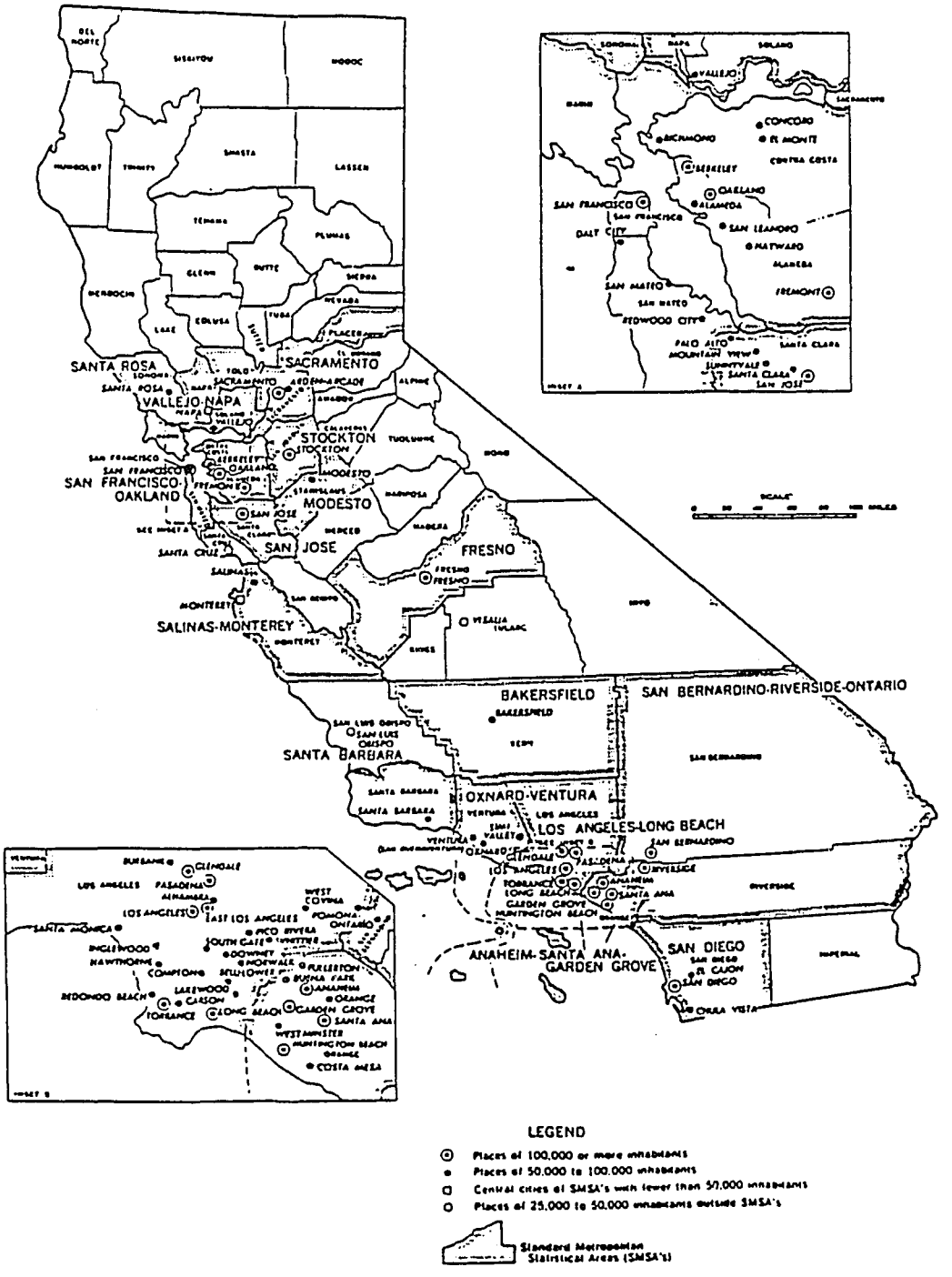

Figure 1. Map of state of California (U.S. Department of Commerce, Bureau of Census [U.S. Census], 1967c, Appendix).

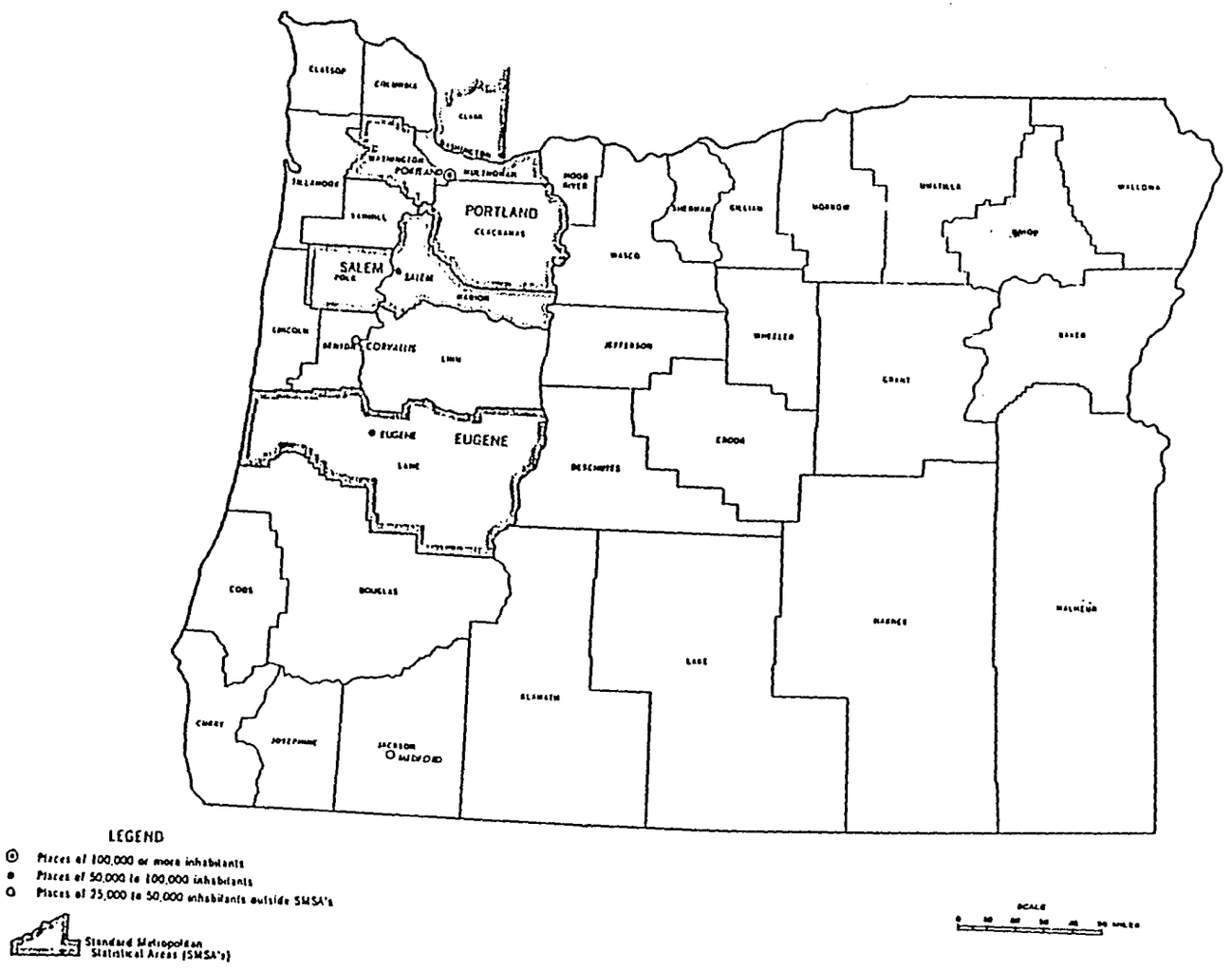

Figure 2. Map of state of Oregon (U.S. Census, 1967c, Appendix).

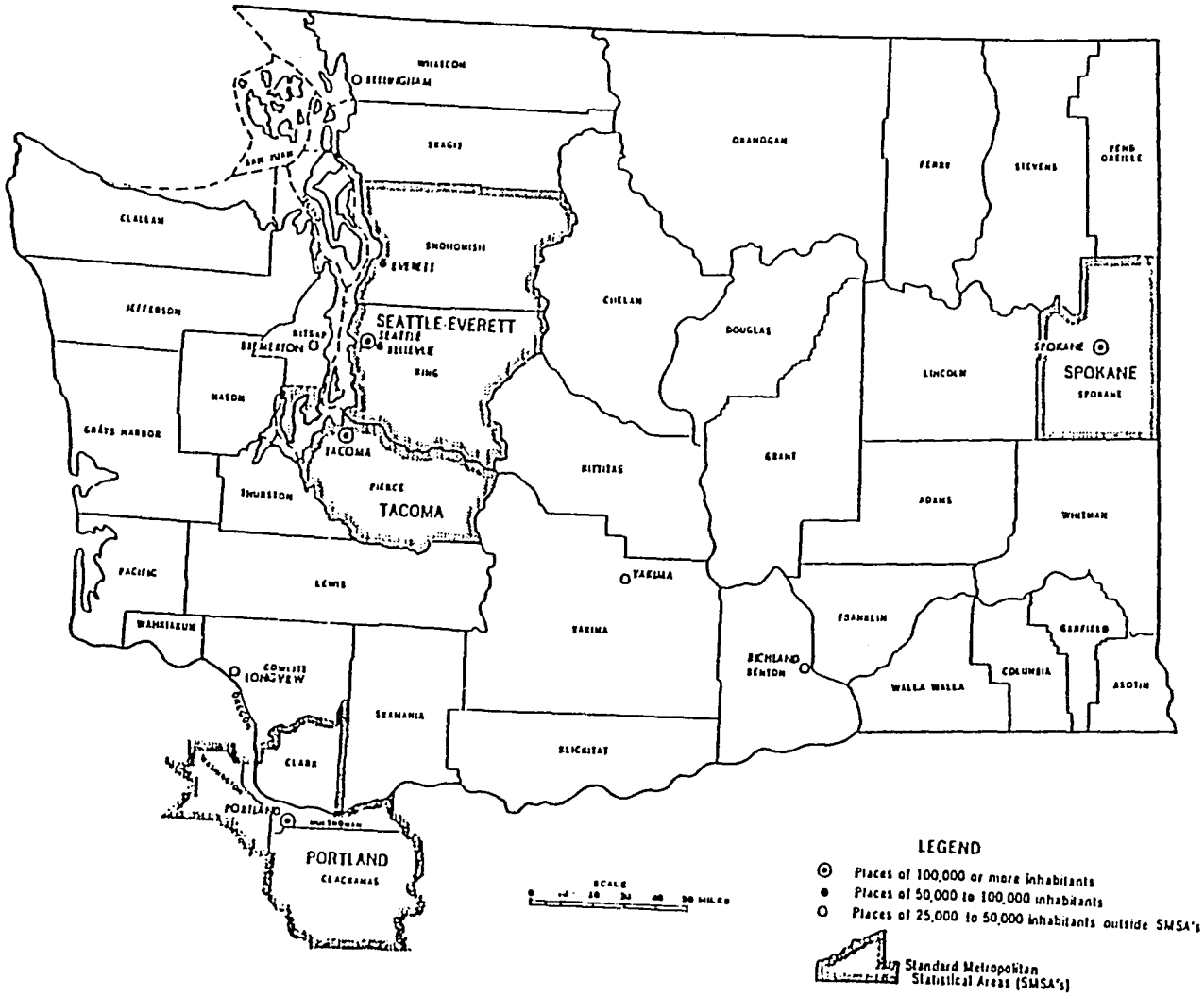

Figure 3. Map of state of Washington (U.S. Census, 1967c, Appendix).

TABLE I

COUNTY NAMES BY SPATIAL REGION

CALIFORNIA	OREGON	WASHINGTON
METRO > 500,000	METRO > 500,000	METRO > 500,000
Alameda	Clackamas	Clark
Contra Costa	Multnomah	King
Los Angeles	Washington	Snohomish
Marin		
Orange	METRO < 500,000	METRO < 500,000
Placer	Lane	Pierce
Riverside	Marion	Spokane
Sacramento	Polk	Yakima
San Bernardino		
San Diego	ADJACENT	ADJACENT
San Francisco	Columbia	Chelan
San Mateo	Hood River	Island
Santa Clara	Tillamook	Kitsap
Yolo	Wasco	Kittitas
	Yamhill	Skagit
METRO < 500,000		
Fresno	NONADJACENT	NONADJACENT
Monterey	Baker	Adams
Napa	Benton	Asotin
San Joaquin	Clatsop	Benton
Santa Barbara	Coos	Clallam
Santa Cruz	Crook	Columbia
Solano	Curry	Cowlitz
Sonoma	Deschutes	Douglas
Stanislaus	Douglas	Ferry
Ventura	Gilliam	Franklin
	Grant	Garfield
ADJACENT	Harney	Grant
Amador	Jackson	Grays Harbor
El Dorado	Jefferson	Jefferson
Imperial	Josephine	Klickitat
Kern	Klamath	Lewis
Merced	Lake	Lincoln
Nevada	Lincoln	Mason
San Benito	Linn	Okanogan
San Luis Obispo	Malheur	Pacific
Sutter	Morrow	Pend Oreille
	Sherman	San Juan
NONADJACENT	Umatilla	Wahkiakum
Alpine	Union	Walla Walla
Butte	Wallowa	Whatcom
Calveras	Wheeler	Whitman

TABLE I

COUNTY NAMES BY SPATIAL REGION
(continued)

CALIFORNIA	OREGON	WASHINGTON
NONADJACENT, cont.		
Del Norte		
Humboldt		
Inyo		
Kings		
Lake		
Lassen		
Madera		
Mariposa		
Mendocino		
Modoc		
Mono		
Plumas		
Shasta		
Sierra		
Siskiyou		
Tehama		
Trinity		
Tulare		
Tuolumne		
Yuba		

Note: Counties defined according to 1970 status.

The unit of analysis used in this study is the interaction of labor flows between counties in the Pacific states. The use of aggregated data, such as state and state economic area data excludes the shorter interarea moves, thus ignoring shorter moves between the different spatial subregions within states. Counties, themselves, do not represent labor markets, but for the most part within counties exist labor markets. Counties with overlapping

labor markets that are adjacent to large metropolitan statistical areas usually are classified by the U.S. Census Bureau as part of the metropolitan region, i.e., the Sacramento region includes Placer and Yolo counties.

The source of data for labor flows is the Continuous Work History One Percent Sample File (CWHS), which is compiled from Social Security Administration records (U.S. Department of Commerce, Bureau of Economic Analysis [U.S. Economic], 1976a, 1976b). This data source contains information on such individual characteristics as gender, age, wage rates, and location of employment by county and industry for the three periods studied (1960-1965, 1965-1970, and 1970-1975).

This study draws from concepts in economics, geography, and sociology to develop a model that addresses what attributes of areas attract labor migration flows. The foci in economics usually are economic opportunities or rational economic decision making. In geography, the focus is the spatial interaction between geographical regions. In sociology, the foci are either motivations for migration, life-cycle changes, social mobility, or the ecological relationship between population and the environment.

The goal of this study is to examine the importance of employment and nonemployment related factors to labor migration. Employment variables are taken from the neoclassical economic model, which states labor migration

flows are from areas which have lower incomes or scarce job opportunities to areas which have higher incomes or plentiful job opportunities. Nonemployment variables are derived from sociological models that identify attributes in the socio-economic and physical environment that make an area more attractive to migrants. The spatial variables are derived from the spatial interaction model found in the geographical literature.

RESEARCH PROCESS

This study utilizes separate spatial models for the three different periods. For each period, models are estimated for metropolitan areas with populations greater than 500,000, metropolitan areas with populations less than 500,000, nonmetropolitan counties adjacent to the larger metropolitan counties, and nonmetropolitan counties that are not adjacent to the larger metropolitan counties.

The research process involves the following steps:

1. Estimating a simultaneous labor flow model to test the determinants of labor in-migration flows and labor out-migration flows, not controlling for county of residence.

2. Testing the hypothesis that labor migration flows to nonmetropolitan regions is a by-product of diffusion of employment opportunities from the larger metropolitan to the

nonmetropolitan nonadjacent counties, by controlling for county of residence.

OUTLINE OF THE DISSERTATION

Chapter II examines the context of the nonmetropolitan turnaround by briefly reviewing the historical migration patterns in the United States. In addition, Chapter II contrasts labor and population migration flows found in the three Pacific states with national and regional patterns of population and labor migration in the 1970s.

Chapter III reviews the theoretical migration literature to develop a conceptual foundation for migration modelling. The theoretical review focuses on economic, geographical, and sociological literatures. The emphasis of the scholarly literature review is on the reasons for the nonmetropolitan turnaround in migration of jobs and people.

Chapter IV describes the model specification for labor force migration and economic deconcentration. This chapter outlines the process of operationalizing, collecting, and processing data for testing the research models, as well as the limitations found in using the various data sources.

Chapter V describes the results of the model calibrations for the labor migration models. Difficulties encountered in the model calibrations are also discussed.

Chapter VI presents the summary and conclusions of the study. This chapter discusses the implications of the model

results and the model limitations. The chapter also compares and contrasts the calibration results for the labor migration flow model with the results for population flow models reported in the literature, as well as future research directions.

CHAPTER II

THE CONTEXT OF THE NONMETROPOLITAN TURNAROUND: A REVIEW OF U.S. MIGRATION FLOWS

To address the issue of the nonmetropolitan turnaround requires examining (a) the historical trends in U.S. settlement patterns, (b) changing economic trends in the 1970s, and (c) comparing the differences in economic and demographic trends between metropolitan and nonmetropolitan counties. This chapter contrasts and compares population and economic trends in the Pacific states with national patterns found in the pre-turnaround and turnaround periods.

To understand the significance and the consequences of the nonmetropolitan turnaround in the 1970s, it is important to look at the past migration trends and the social and economic structure of metropolitan and nonmetropolitan counties. Since the late nineteenth century, scholars have regarded rural to urban migration to be a reflection of social and economic change. The process of industrialization leads to rapid economic growth in urban centers and economic decline in their rural periphery. In the late nineteenth and the twentieth century, industrialization in the United States caused urban areas to be economically more attractive than rural areas. The shift from an agrarian to an industrial economy reduced the demand

for farm labor, thus leaving few alternatives to agrarian employment in the nonmetropolitan counties. The lack of employment opportunities forced the out-migration of the young, even when surveys revealed residents preferred to live in nonmetropolitan counties (Lonsdale & Seyler, 1979).

One of the first scholars to theorize about migration was Ravenstein (1885, 1889). Seven laws of migration can be summarized from Ravenstein's work: (a) migrants tend to move short distances toward centers of industry and commerce, (b) dispersion is the inverse of absorption, (c) each migration flow produces a counter flow, (d) more females move shorter distances than males, (e) rural flows tend to be greater than urban flows, (f) there exists an interrelationship between technology and migration, and (g) the predominant motive for migration is economic (Lee, 1966).

Until the 1970s, U.S. migration flows supported Ravenstein's hypothesis (Lee, 1966). From the works of Kasarda (1980), Sharpless (1980), and Wardwell and Brown (1980), four trends in migration flows can be synthesized for the United States. The first flow is the movement to the western frontier after the Revolutionary War until about 1890. In 1870, only 3% of all Americans lived beyond the Appalachian region. By 1900, about 21 million people lived in the area beyond the Mississippi or 28% of the total population (Sharpless, 1980).

The second flow is the migration movement during the period of industrialization between 1890 and 1940. In 1890, 7% of the U.S. population lived in cities over 50,000. By 1920, 31% of the U.S. population lived in cities over 50,000 and 15% lived in cities over 500,000. The number of rural out-migrants consistently outnumbered the number of urban out-migrants during this period and continued to do so until 1970 (Kasarda, 1980).

The impetus for the movement away from rural regions comes primarily from changes within the structure of the agrarian economy. Changes in agrarian technology has brought increased mechanization of farms reducing the number of man-hours needed for total agricultural production. Because of the decrease in man-hours, America's major agricultural belts experienced a reduction in population growth. The U.S. Censuses of Population and Housing show a population decline of 27% for the U.S. Corn Belt and 36% for the U.S. Cotton Belts between 1940 and 1970 (Wardwell & Brown, 1980).

A third migration flow is a movement away from the South during the period between 1940 and 1970. The U.S. Censuses for Population and Housing taken between the years of 1940 and 1970 show that the South had negative net migration with all other U.S. regions (Kasarda, 1980). A major proportion of the migrants who left the South was Afro-American during this period. In total, approximately

three and a half million Afro-Americans left the South between 1940 and 1970 (Kasarda, 1980).

Recent studies on U.S. settlement patterns point to two new migration movements in the 1970s (Perry & Watkins, 1977; Sawers & Tabb, 1984). The first trend is a reversal of the migration away from the South and a consequent rise of the Sunbelt Cities. Between 1970 and 1975, the South had a net gain of 1,829,000 migrants compared to a net gain of 656,000 migrants between 1965 and 1970. The second movement is a reversal of the movement away from nonmetropolitan counties. For the first time in the twentieth century, there was net migration to nonmetropolitan counties. Metropolitan counties lost 1,594,000 migrants to nonmetropolitan counties between 1970 and 1975 and 1,344,000 migrants between 1975 and 1980 (see Tables II and III).

Berry (1976c) postulates that the population deconcentration process in the 1970s represents a counterurbanization process. Berry defines counterurbanization as a process, which is " . . . a movement away from a state of more concentration to a state of less concentration" (p. 17).

Berry (1976c) notes that although some scholars claim the 1970s data represents a "temporary perturbation," this attitude is not credible (p. 24). According to Berry, throughout the 20th century all trends have pointed

> . . . to a trend [that] has been one leading unremittingly toward the reversal of the process

of population concentration unleashed by technologies of the Industrial Revolution. (p. 24)

TABLE II

INTERREGIONAL MIGRATION, 1965-1970 AND 1970-1975

	NORTHEAST	NORTH CENTRAL	SOUTH	WEST
		(1,000s)		
1965-1970				
In-Migrants	1,273	2,024	3,142	2,309
Out-Migrants	1,988	2,661	2,486	1,613
Net Migration	(715)	(637)	656	696
1970-1975				
In-Migrants	1,057	1,731	4,082	2,347
Out-Migrants	2,399	2,926	2,253	1,639
Net Migration	(1,342)	(1,195)	1,829	708

Note: Parentheses indicate negative numbers.
Source: U.S. Census (1981, p. 1).

To support this claim, Berry (1976c) cites evidence from historical public opinion polls that note Americans prefer smaller places, low density, and places rich in environmental amenities. In fact, Berry asserts that the movement toward population deconcentration is not a new trend, rather it is " . . . a reassertation of fundamental predispositions of the American culture" (p. 24).

TABLE III

U.S. METROPOLITAN AND NONMETROPOLITAN MIGRATION, 1965-1980

	1965-1970	1970-1975	1975-1980
	(In 1,000s)		
METROPOLITAN			
In-Migrants	5,457	5,127	5,993
Out-Migrants	5,809	6,721	7,337
Net Migration	(352)	(1,594)	(1,344)
NONMETROPOLITAN			
In-Migrants	5,809	6,721	7,337
Out-Migrants	5,457	5,127	5,993
Net Migration	352	1,594	1,344

Note: Parentheses indicate negative numbers.
Source: U.S. Census (1981, Table C).

This rural resurgence in the 1970s was not just a phenomenon associated with the United States, but also happened elsewhere, i.e., Belgium, Denmark, Norway, and Sweden. Vining and Kontuly (1978) found similar rural urban migration patterns internationally during the turnaround period for other developed nations. The degree of similarity found in the international migration patterns suggested to Wardwell (1980) that research should concentrate on the factors that are common to all of these areas, and the focus should be on two distinct questions--"Why?" and "Why in the 1970s?" did this change happen.

The amount of net migration in nonmetropolitan counties in the 1970s varied according to the county's proximity to large metropolitan areas in the United States. Counties adjacent to large metropolitan areas had a net migration gain of 7.5% in the 1970s compared to a net migration gain of 4.9% for the counties not adjacent to metropolitan areas. Within the West, the gains were higher than the national average, a gain of approximately 19.5% for adjacent counties and 12.1% for nonadjacent counties (Fuguitt, Voss, & Doherty, 1979). The higher growth in adjacent counties may be a sign of spreading urbanization (Fuguitt, Voss, & Doherty, 1979). The degree of nonmetropolitan growth in the West makes the region an ideal case study for the nonmetropolitan turnaround in the 1970s.

POPULATION CHANGE IN THE PACIFIC COAST STATES

The three Pacific states have had similar patterns of population change in the 1970s as the rest of the western states had. Both adjacent and nonadjacent counties showed substantial population growth in the 1970s. Between 1970 and 1980, counties with the highest rates of population growth in the Pacific states were nonmetropolitan counties. In California, the counties that had a population increase of more than 25% in order are Alpine, Nevada, Lake, El Dorado, Mariposa, Amador, Calaveras, and Trinity. Four of these counties were adjacent to the smaller metropolitan

statistical areas (SMSAs); the rest of these counties are nonadjacent nonmetropolitan counties. In Oregon, the counties with a population increase greater than 25% were Morrow, Josephine, and Deschutes (all of which are nonadjacent nonmetropolitan counties). In Washington, the counties with a population increase greater than 25% were San Juan, Benton, Ferry, Stevens, Thurston, Jefferson, and Island. One of these Washington counties was part of a smaller metropolitan statistical area, three were adjacent to metropolitan statistical areas, and the rest were nonadjacent nonmetropolitan counties (see Table IV).

Population change has not been uniform in the Pacific nonmetropolitan counties. While several counties had rapid population growth, a few counties continued to lose population between 1970 and 1980. For instance, in California, both Colusa and King lost population. In Oregon, the counties of Sherman and Wheeler lost population as well. In Washington, the counties of Adams, Columbia, Garfield, Kittitas, and Whitman all lost population.

The large metropolitan areas in all three of the Pacific states lost a shift of population away from the core counties containing the central city to their suburban counties in the periphery. In California and Oregon, all the core counties of the metropolitan statistical areas with a population over 500,000 lost population in the 1970s. In Washington, however, both the core and suburban periphery

TABLE IV

POPULATION CHANGE IN THE PACIFIC STATES, 1960-1975

COUNTY	1960	1965	1970	1975	CHANGE 1960-1965	CHANGE 1965-1970	CHANGE 1970-1975
CALIFORNIA							
METRO > 500,000							
ALAMEDA	908,209	1,022,700	1,071,446	1,090,600	114,491	48,746	19,154
CONTRA COSTA	409,030	495,100	556,116	597,500	86,070	61,016	41,384
LOS ANGELES	6,038,771	6,766,700	7,041,980	6,958,900	727,929	275,280	(83,080)
MARIN	146,820	148,800	208,652	219,600	1,980	59,852	10,948
ORANGE	703,925	1,144,100	1,421,233	1,703,000	440,175	277,133	281,767
PLACER	56,998	73,000	77,632	91,000	16,002	4,632	13,368
RIVERSIDE	306,191	405,400	456,916	528,900	99,209	51,516	71,984
SACRAMENTO	502,778	510,300	634,373	691,400	7,522	124,073	57,027
SAN BERNARDINO	503,591	620,208	682,233	696,800	116,617	62,025	14,567
SAN DIEGO	1,033,011	1,165,600	1,357,854	1,593,800	132,589	192,254	235,946
SAN FRANCISCO	740,316	742,200	715,674	669,100	1,884	(26,526)	(46,574)
SAN MATEO	444,387	516,900	557,361	582,000	72,513	40,461	24,639
SANTA CLARA	642,315	900,700	1,065,313	1,178,500	258,385	164,613	113,187
YOLO	65,727	82,100	91,788	101,600	16,373	9,688	9,812
TOTAL	12,502,069	14,593,808	15,938,571	16,702,700	2,091,739	1,344,763	764,129
METRO < 500,000							
FRESNO	365,945	403,900	413,329	447,900	37,955	9,429	34,571
MONTEREY	198,351	224,400	247,450	269,700	26,049	23,050	22,250
NAPA	65,890	66,400	79,140	91,700	510	12,740	12,560
SAN JOAQUIN	249,989	272,300	291,073	299,400	22,311	18,773	8,327
SANTA BARBARA	163,962	247,500	264,324	280,500	83,538	16,824	16,176
SANTA CRUZ	84,219	108,100	123,790	156,600	23,881	15,690	32,810
SOLANO	134,597	159,700	171,989	187,600	25,103	12,289	15,611
SONOMA	147,375	182,500	204,885	187,600	35,125	22,385	(17,285)
STANISLAUS	157,294	176,400	194,506	224,600	19,106	18,106	30,094
VENTURA	199,138	311,300	378,497	440,500	112,162	67,197	62,003
TOTAL	1,766,760	2,152,500	2,368,983	2,586,100	385,740	216,483	217,117

TABLE IV

POPULATION CHANGE IN THE PACIFIC STATES, 1960-1975
(continued)

COUNTY	1960	1965	1970	1975	CHANGE 1960-1965	CHANGE 1965-1970	CHANGE 1970-1975
CALIFORNIA, CONTINUED							
ADJACENT							
AMADOR	9,990	11,000	11,821	19,314	1,010	821	7,493
EL DORADO	29,390	41,700	43,833	59,200	12,310	2,133	15,367
IMPERIAL	72,105	75,600	74,492	84,100	3,495	(1,108)	9,608
KERN	291,984	321,400	330,234	347,500	29,416	8,834	17,266
MERCED	90,446	90,900	104,629	118,700	454	13,729	14,071
NEVADA	20,911	21,200	26,346	34,000	289	5,146	7,654
SAN BENITO	15,396	15,500	18,226	19,800	104	2,726	1,574
SAN LUIS OBISPO	81,044	97,700	105,690	128,900	16,656	7,990	23,210
SUTTER	33,380	39,300	41,935	46,300	5,920	2,635	4,365
TOTAL	644,646	714,300	757,206	857,814	69,654	42,906	100,608
NONADJACENT							
ALPINE	397	400	484	800	3	84	316
BUTTE	82,030	100,700	101,969	120,500	18,670	1,269	18,531
CALVERAS	10,289	12,000	13,585	15,600	1,711	1,585	2,015
COLUSA	12,075	12,200	12,430	12,600	125	230	170
DEL NORTE	17,771	16,300	14,580	15,800	(1,471)	(1,720)	1,220
GLENN	17,245	18,400	17,521	19,300	1,155	(879)	1,779
HUMBOLDT	104,892	101,600	99,692	106,600	(3,292)	(1,908)	6,908
INYO	11,684	13,900	15,571	17,400	2,216	1,671	1,829
KINGS	49,954	64,400	66,717	68,700	14,446	2,317	1,983
LAKE	13,786	13,900	19,548	25,700	114	5,648	6,152
LASSEN	13,597	16,200	16,796	18,700	2,603	596	1,904
MADERA	40,468	40,700	41,519	47,000	232	819	5,481
MARIPOSA	5,064	5,962	6,015	8,400	898	53	2,385
MENDOCINO	51,059	51,000	51,101	59,300	(59)	101	8,199
MODOC	8,308	7,500	7,469	8,000	(808)	(31)	531
MONO	2,213	4,367	4,016	7,300	2,154	(351)	3,284
PLUMAS	11,620	12,200	11,707	14,100	580	(493)	2,393
SHASTA	59,468	73,100	77,640	92,400	13,632	4,540	14,760
SIERRA	2,247	2,400	2,365	2,800	153	(35)	435

TABLE IV

POPULATION CHANGE IN THE PACIFIC STATES, 1960-1975
(continued)

COUNTY	1960	1965	1970	1975	CHANGE 1960-1965	CHANGE 1965-1970	CHANGE 1970-1975
CALIFORNIA, CONTINUED							
NONADJACENT							
SISKIYOU	32,885	33,600	33,225	35,400	715	(375)	2,175
TEHAMA	25,305	28,600	29,517	32,100	3,295	917	2,583
TRINITY	9,706	7,700	7,615	9,600	(2,006)	(85)	1,985
TULARE	168,403	183,200	188,322	209,400	14,797	5,122	21,078
TUOLUMNE	14,404	17,900	22,169	26,000	3,496	4,269	3,831
YUBA	33,859	42,500	44,736	45,200	8,641	2,236	464
TOTAL	798,729	880,729	906,309	1,018,700	82,000	25,580	112,391
OREGON							
METRO > 500,000							
CLACKAMAS	113,038	134,000	166,088	206,602	20,962	32,088	40,514
MULTNOMAH	522,813	555,000	554,668	552,363	32,187	(332)	(2,305)
WASHINGTON	92,237	122,000	157,920	192,904	29,763	35,920	34,984
TOTAL	728,088	811,000	878,676	951,869	82,912	67,676	73,193
METRO < 500,000							
LANE	162,890	198,000	215,401	241,488	35,110	17,401	26,087
MARION	120,888	145,000	151,309	171,519	24,112	6,309	20,210
POLK	26,523	34,200	35,349	41,015	7,677	1,149	5,666
TOTAL	310,301	377,200	402,059	454,022	66,899	24,859	51,963
ADJACENT							
COLUMBIA	22,379	24,300	28,970	31,992	1,921	4,670	3,022
HOOD RIVER	13,395	14,200	13,187	14,675	805	(1,013)	1,488
TILLAMOOK	18,955	16,100	18,034	18,397	(2,855)	1,934	363
WASCO	20,205	23,300	20,133	20,336	3,095	(3,167)	203
YAMHILL	32,478	39,900	40,213	46,139	7,422	313	5,926
TOTAL	107,412	117,800	120,537	131,539	10,388	2,737	11,002

TABLE IV

POPULATION CHANGE IN THE PACIFIC STATES, 1960-1975
(continued)

COUNTY	1960	1965	1970	1975	CHANGE 1960-1965	CHANGE 1965-1970	CHANGE 1970-1975
OREGON, CONTINUED							
NONADJACENT							
BAKER	17,295	15,600	14,919	15,540	(1,695)	(681)	621
BENTON	39,165	45,800	53,776	62,508	6,635	7,976	8,732
CLATSOP	27,380	27,700	28,473	29,612	320	773	1,139
COOS	54,955	52,400	56,515	59,737	(2,555)	4,115	3,222
CROOK	9,430	8,900	9,985	11,686	(530)	1,085	1,701
CURRY	13,983	13,000	13,006	14,148	(983)	6	1,142
DESCHUTES	23,100	27,000	30,442	42,422	3,900	3,442	11,980
DOUGLAS	68,458	76,000	71,743	83,074	7,542	(4,257)	11,331
GILLIAM	3,069	3,200	2,342	2,132	131	(858)	(210)
GRANT	7,726	7,600	6,996	7,412	(126)	(604)	416
HARNEY	6,744	7,100	7,215	7,184	356	115	(31)
JACKSON	73,962	92,100	94,533	113,850	18,138	2,433	19,317
JEFFERSON	7,130	10,000	8,548	10,122	2,870	(1,452)	1,574
JOSEPHINE	29,917	35,100	35,746	47,109	5,183	646	11,363
KLAMATH	47,475	48,100	50,021	55,236	625	1,921	5,215
LAKE	7,158	6,200	6,343	6,543	(958)	143	200
LINCOLN	24,635	23,200	25,755	28,335	(1,435)	2,555	2,580
LINN	58,867	65,000	71,914	80,084	6,133	6,914	8,170
MALHEUR	22,764	25,400	23,169	24,635	2,636	(2,231)	1,466
MORROW	4,871	4,750	4,465	5,272	(121)	(285)	807
SHERMAN	2,446	3,250	2,139	2,112	804	(1,111)	(27)
UMATILLA	44,352	43,100	44,923	48,808	(1,252)	1,823	3,885
UNION	18,180	17,800	19,377	22,364	(380)	1,577	2,987
WALLOWA	7,102	6,050	6,247	6,806	(1,052)	197	559
WHEELER	2,722	1,800	1,849	2,052	(922)	49	203
TOTAL	848,227	907,450	959,253	1,070,183	59,223	51,803	110,930

TABLE IV

POPULATION CHANGE IN THE PACIFIC STATES, 1960-1975
(continued)

COUNTY	1960	1965	1970	1975	CHANGE 1960-1965	CHANGE 1965-1970	CHANGE 1970-1975
WASHINGTON							
METRO > 500,000							
CLARK	93,809	105,000	128,454	149,000	11,191	23,454	20,546
KING	935,014	1,024,000	1,159,375	1,148,000	88,986	135,375	(11,375)
SNOHOMISH	172,199	212,700	265,236	268,000	40,501	52,536	2,764
TOTAL	1,201,022	1,341,700	1,553,065	1,565,000	140,678	211,365	11,935
METRO < 500,000							
PIERCE	321,590	358,600	411,027	413,500	37,010	52,427	2,473
SPOKANE	278,333	277,200	287,487	298,000	(1,133)	10,287	10,513
YAKIMA	145,112	143,400	145,212	147,600	(1,712)	1,812	2,388
TOTAL	745,035	779,200	843,726	859,100	34,165	64,526	15,374
ADJACENT							
CHELAN	40,744	39,800	41,355	40,900	(944)	1,555	(455)
ISLAND	19,638	22,400	27,011	30,000	2,762	4,611	2,989
KITSAP	84,176	89,800	101,732	116,224	5,624	11,932	14,492
KITTITAS	20,467	22,400	25,039	25,300	1,933	2,639	261
SKAGIT	51,350	50,900	52,381	53,400	(450)	1,481	1,019
TOTAL	216,375	225,300	247,518	265,824	8,925	22,218	18,306
NONADJACENT							
ADAMS	9,929	10,400	12,014	12,400	471	1,614	386
ASOTIN	12,909	12,900	13,799	14,800	(9)	899	1,001
BENTON	62,070	62,500	67,540	78,700	430	5,040	11,160
CLALLAM	30,022	31,900	34,770	37,000	1,878	2,870	2,230
COLUMBIA	4,569	4,500	4,439	4,500	(69)	(61)	61
COWLITZ	57,801	62,500	68,616	70,700	4,699	6,116	2,084
DOUGLAS	14,890	15,300	16,787	18,100	410	1,487	1,313

TABLE IV

POPULATION CHANGE IN THE PACIFIC STATES, 1960-1975
(continued)

COUNTY	1960	1965	1970	1975	CHANGE 1960-1965	CHANGE 1965-1970	CHANGE 1970-1975
WASHINGTON, CONTINUED							
NONADJACENT							
FERRY	3,889	3,900	3,655	4,200	11	(245)	545
FRANKLIN	23,342	23,800	25,816	26,700	458	2,016	884
GARFIELD	2,976	2,800	2,911	2,800	(176)	111	(111)
GRANT	46,477	44,500	41,881	42,700	(1,977)	(2,619)	819
GRAYS HARBOR	54,465	56,400	59,553	60,200	1,935	3,153	647
JEFFERSON	9,639	9,800	10,661	11,100	161	861	439
KLICKITAT	13,455	12,900	12,138	13,000	(555)	(762)	862
LEWIS	41,858	42,900	45,467	47,100	1,042	2,567	1,633
LINCOLN	10,919	10,100	9,572	9,300	(819)	(528)	(272)
MASON	16,251	17,800	20,918	22,200	1,549	3,118	1,282
OKANOGAN	6,914	25,100	25,867	26,500	18,186	767	633
PACIFIC	25,520	14,700	15,796	15,900	(10,820)	1,096	104
PEND OREILLE	14,674	6,100	6,025	6,500	(8,574)	(75)	475
SAN JUAN	2,872	3,100	3,856	4,500	228	756	644
SKAMANIA	5,207	5,500	5,845	5,900	293	345	55
STEVENS	17,884	17,500	17,405	19,000	(384)	(95)	1,595
THURSTON	55,049	64,400	76,894	85,900	9,351	12,494	9,006
WAHKIAKUM	3,426	3,400	3,592	3,500	(26)	192	(92)
WALLA WALLA	42,195	41,400	42,176	42,200	(795)	776	24
WHATCOM	70,317	75,100	85,000	86,200	4,783	9,900	1,200
WHITMAN	31,263	34,000	37,900	38,700	2,737	3,900	800
TOTAL	465,441	473,900	502,081	528,900	8,459	28,181	26,819

Note: Parentheses indicate numbers.
Source: U.S. Census (1960, 1970a), California State Census (1965, 1975), Center for Population (1965, 1975), Labor Market (1965, 1975).

counties of the Seattle metropolitan statistical area (King county) gained population. However, the suburban counties' net migration gain is much greater than the core county's net migration gain.

The pattern of growth in the Pacific states in the 1970s is in contrast to previous periods. Table IV shows that between 1960 to 1970 several of the nonadjacent nonmetropolitan counties experienced negative population growth. Adjacent counties in Oregon and Washington experienced population losses in the 1960s. However, the majority of adjacent counties in California experienced population gains. All the smaller and larger metropolitan counties, except for San Francisco county, gained population in the 1960s.

The pattern of labor force movement is very similar to the pattern of general population movement in the three Pacific states. Table V shows that the highest percentage increase of net civilian labor force migration between 1960 and 1970 occurred in metropolitan counties with populations greater than 500,000, whereas net losses of labor migration occurred in the majority of metropolitan counties with populations less than 500,000 and nonmetropolitan counties.

TABLE V

LABOR MIGRANT FLOWS, 1965-1975

	NUMBER OF LABOR MIGRANTS						DIFFERENCE BETWEEN IN AND OUT		
COUNTY	IN-MIGRANTS 1965	OUT-MIGRANTS 1965	IN-MIGRANTS 1970	OUT-MIGRANTS 1970	IN-MIGRANTS 1975	OUT-MIGRANTS 1975	NET MIGRATION 1965	NET MIGRATION 1970	NET MIGRATION 1975
CALIFORNIA									
METRO > 500,000									
ALAMEDA	385	487	581	474	480	542	102	94	(107)
CONTRA COSTA	172	145	232	179	198	226	(27)	87	(53)
LOS ANGELES	1,546	1,785	1,738	2,074	1,470	2,317	239	(47)	336
MARIN	93	65	82	90	96	70	(28)	17	8
ORANGE	539	293	630	481	831	566	(246)	337	(149)
PLACER	48	18	37	50	43	38	(30)	19	13
RIVERSIDE	140	114	189	168	208	180	(26)	75	(21)
SACRAMENTO	345	190	403	304	367	269	(155)	213	(99)
SAN BERNARDINO	205	187	294	246	267	286	(18)	107	(48)
SAN DIEGO	180	349	330	269	382	302	169	(19)	(61)
SAN FRANCISCO	531	753	733	742	609	749	222	(20)	9
SAN MATEO	296	284	366	297	357	330	(12)	82	(69)
SANTA CLARA	398	411	510	350	580	441	13	99	(160)
YOLO	35	33	35	45	31	34	(2)	2	10
TOTAL	4,913	5,114	6,160	5,769	5,919	6,350	201	1,046	(391)
METRO < 500,000									
FRESNO	100	123	119	140	138	117	23	(4)	21
MONTEREY	80	56	82	66	85	61	(24)	26	(16)
NAPA	24	12	21	29	29	17	(12)	9	8
SAN JOAQUIN	72	76	108	78	102	93	4	32	(30)
SANTA BARBARA	126	81	96	104	104	100	(45)	15	8
SANTA CRUZ	39	38	30	58	55	44	(1)	(8)	28
SOLANO	36	42	47	45	49	45	6	5	(2)
SONOMA	65	45	60	62	73	61	(20)	15	2
STANISLAUS	56	38	77	74	58	70	(18)	39	(3)
VENTURA	116	58	105	109	140	88	(58)	47	4
TOTAL	714	569	745	765	833	696	(145)	176	20
ADJACENT									
AMADOR	12	26	3	10	4	1	14	(23)	7
EL DORADO	17	15	15	23	14	5	(2)	0	8
IMPERIAL	20	26	23	38	22	28	6	(3)	15
KERN	85	88	142	146	105	123	3	54	4
MERCED	21	29	16	47	30	23	8	(13)	31
NEVADA	10	15	11	11	16	6	5	(4)	0
SAN BENITO	11	2	8	12	6	6	(9)	6	4
SAN LUIS OBISPO	25	42	33	30	47	36	17	(9)	(3)
SUTTER	18	18	12	21	13	14	0	(6)	9
TOTAL	219	261	263	338	257	242	42	2	75

TABLE V

LABOR MIGRANT FLOWS, 1965-1975
(continued)

COUNTY	NUMBER OF LABOR MIGRANTS						DIFFERENCE BETWEEN IN AND OUT		
	IN-MIGRANTS 1965	OUT-MIGRANTS 1965	IN-MIGRANTS 1970	OUT-MIGRANTS 1970	IN-MIGRANTS 1975	OUT-MIGRANTS 1975	NET MIGRATION 1965	NET MIGRATION 1970	NET MIGRATION 1975
CALIFORNIA, CONTINUED									
NONADJACENT									
ALPINE	6	26	0	6	1	0	20	(26)	6
BUTTE	55	37	38	50	40	45	(18)	1	12
CALVERAS	6	23	3	9	8	6	17	(20)	6
COLUSA	7	9	4	7	9	5	2	(5)	3
DEL NORTE	20	18	9	12	13	6	(2)	(9)	3
GLENN	11	7	6	16	8	7	(4)	(1)	10
HUMBOLDT	34	74	42	48	36	50	40	(32)	6
INYO	5	3	12	7	9	2	(2)	9	(5)
KINGS	19	19	8	20	11	12	0	(11)	12
LAKE	5	6	3	4	3	5	1	(3)	1
LASSEN	5	5	8	3	8	4	0	3	(5)
MADERA	13	14	10	20	18	14	1	(4)	10
MARIPOSA	8	3	2	7	3	2	(5)	(1)	5
MENDOCINO	16	20	12	27	15	10	4	(8)	15
MODOC	8	7	1	10	4	1	(1)	(6)	9
MONO	9	2	1	11	12	3	(7)	(1)	10
PLUMAS	10	9	3	13	2	5	(1)	(6)	10
SHASTA	39	26	29	54	25	28	(13)	3	25
SIERRA	5	2	0	5	0	1	(3)	(2)	5
SISKIYOU	13	16	10	17	9	7	3	(6)	7
TEHAMA	18	15	16	15	11	14	(3)	1	(1)
TRINITY	3	5	2	2	2	1	2	(3)	0
TULARE	44	65	51	51	57	55	21	(14)	0
TUOLUMNE	15	3	8	10	12	5	(12)	5	2
YUBA	32	30	21	21	18	13	(2)	(9)	0
TOTAL	406	444	299	445	334	301	38	(145)	146
OREGON									
METRO > 500,000									
CLACKAMAS	53	52	69	70	116	48	(1)	17	1
MULTNOMAH	290	306	394	330	418	401	16	88	(64)
WASHINGTON	66	27	75	52	119	54	(39)	48	(23)
TOTAL	409	385	538	452	653	503	(24)	153	(86)
METRO < 500,000									
LANE	109	96	106	129	98	102	(13)	10	23
MARION	90	48	85	69	105	72	(42)	37	(16)
POLK	7	16	11	5	6	14	9	(5)	(6)
TOTAL	206	160	202	203	209	188	(46)	42	1

TABLE V

LABOR MIGRANT FLOWS, 1965-1975
(continued)

COUNTY	NUMBER OF LABOR MIGRANTS						DIFFERENCE BETWEEN IN AND OUT		
	IN-MIGRANTS 1965	OUT-MIGRANTS 1965	IN-MIGRANTS 1970	OUT-MIGRANTS 1970	IN-MIGRANTS 1975	OUT-MIGRANTS 1975	NET MIGRATION 1965	NET MIGRATION 1970	NET MIGRATION 1975
OREGON, CONTINUED									
ADJACENT									
COLUMBIA	13	10	7	15	15	14	(3)	(3)	8
HOOD RIVER	8	7	7	8	11	7	(1)	0	1
TILLAMOOK	6	10	4	8	3	5	4	(6)	4
WASCO	9	9	2	13	5	7	0	(7)	11
YAMHILL	17	16	15	26	33	35	(1)	(1)	11
TOTAL	53	52	35	70	67	68	(1)	(17)	35
NONADJACENT									
BAKER	4	10	7	2	9	6	6	(3)	(5)
BENTON	23	29	38	31	58	48	6	9	(7)
CLATSOP	8	12	12	13	6	14	4	0	1
COOS	23	39	21	22	28	26	16	(18)	1
CROOK	2	5	6	5	6	2	3	1	(1)
CURRY	10	11	11	9	2	11	1	0	(2)
DESCHUTES	8	9	16	16	22	9	1	7	0
DOUGLAS	31	34	26	37	34	30	3	(8)	11
GILLIAM	1	1	0	2	0	0	0	(1)	2
GRANT	6	1	2	6	2	3	(5)	1	4
HARNEY	2	2	5	1	2	1	0	3	(4)
JACKSON	29	21	34	32	60	32	(8)	13	(2)
JEFFERSON	12	1	2	11	5	2	(11)	1	9
JOSEPHINE	21	10	18	26	22	12	(11)	8	8
KLAMATH	17	23	14	20	13	20	6	(9)	6
LAKE	3	3	7	5	3	6	0	4	(2)
LINCOLN	11	18	12	13	19	4	7	(6)	1
LINN	40	28	52	34	46	36	(12)	24	(18)
MALHEUR	4	7	7	6	2	4	3	0	(1)
MORROW	0	5	2	1	0	0	5	(3)	(1)
SHERMAN	12	3	0	10	0	0	(9)	(3)	10
UMATILLA	13	25	20	24	23	21	12	(5)	4
UNION	7	6	3	10	3	4	(1)	(3)	7
WALLOWA	0	5	1	0	1	1	5	(4)	(1)
WHEELER	3	2	1	1	0	16	(1)	(1)	0
TOTAL	394	388	449	458	531	415	(6)	61	9
WASHINGTON									
METRO > 500,000									
CLARK	37	24	48	31	59	48	(13)	24	(17)
KING	358	351	511	363	413	514	(7)	160	(148)
SNOHOMISH	58	45	133	75	104	135	(13)	88	(58)
TOTAL	453	420	692	469	576	697	(33)	272	(223)

TABLE V

LABOR MIGRANT FLOWS, 1965-1975
(continued)

COUNTY	NUMBER OF LABOR MIGRANTS						DIFFERENCE BETWEEN IN AND OUT		
	IN-MIGRANTS 1965	OUT-MIGRANTS 1965	IN-MIGRANTS 1970	OUT-MIGRANTS 1970	IN-MIGRANTS 1975	OUT-MIGRANTS 1975	NET MIGRATION 1965	NET MIGRATION 1970	NET MIGRATION 1975
WASHINGTON, CONTINUED									
METRO < 500,000									
PIERCE	87	101	105	104	122	116	14	4	(1)
SPOKANE	67	97	78	90	81	87	30	(19)	12
YAKIMA	53	60	51	73	93	71	7	(9)	22
TOTAL	207	258	234	267	296	274	51	(24)	33
ADJACENT									
CHELAN	16	17	10	19	22	15	1	(7)	9
ISLAND	1	4	2	2	6	3	3	(2)	0
KITSAP	20	26	24	26	29	17	6	(2)	2
KITTITAS	6	11	10	10	9	11	5	(1)	0
SKAGIT	14	10	17	26	25	18	(4)	7	9
TOTAL	57	68	63	83	91	64	11	(5)	20
NONADJACENT									
ADAMS	4	3	6	7	7	6	(1)	3	1
ASOTIN	0	0	2	2	2	4	0	2	0
BENTON	18	23	35	37	38	37	5	12	2
CLALLAM	11	10	12	7	12	22	(1)	2	(5)
COLUMBIA	1	1	1	0	2	0	0	0	(1)
COWLITZ	33	30	43	29	35	27	(3)	13	(14)
DOUGLAS	2	2	6	1	5	3	0	4	(5)
FERRY	2	0	1	2	3	1	(2)	1	1
FRANKLIN	13	2	15	18	11	14	(11)	13	3
GARFIELD	0	19	0	0	0	0	19	(19)	0
GRANT	12	1	12	22	15	23	(11)	11	10
GRAYS HARBOR	20	24	32	31	22	26	4	8	(1)
JEFFERSON	5	1	2	4	8	3	(4)	1	2
KLICKITAT	4	6	5	6	1	7	2	(1)	1
LEWIS	19	23	16	24	20	22	4	(7)	8
LINCOLN	2	1	1	3	3	3	(1)	0	2
MASON	3	21	30	7	10	7	18	9	(23)
OKANOGAN	5	2	0	5	2	3	(3)	(2)	5
PACIFIC	0	8	7	8	16	9	8	(1)	1
PEND OREILLE	8	10	3	11	5	5	2	(7)	8
SAN JUAN	2	2	1	1	3	2	0	(1)	0
SKAMANIA	2	1	1	1	0	1	(1)	0	0
STEVENS	1	3	6	4	6	4	2	3	(2)
THURSTON	49	24	70	40	96	40	(25)	46	(30)
WAHKIAKUM	5	0	1	2	2	1	(5)	1	1
WALLA WALLA	18	11	11	18	17	10	(7)	0	7
WHATCOM	24	28	31	35	25	31	4	3	4
WHITMAN	5	11	12	21	19	20	6	1	9
TOTAL	164	189	230	225	220	224	25	41	(5)

Note: Parenthesis indicate negative numbers.
Source: Calculated from Continuous Work History File One Percent Sample 1965, 1970 and 1975 (U.S. Economic, 1976a).

By contrast, the majority of nonmetropolitan counties in the Pacific states gained labor migrants between 1970 and 1975. The majority of the metropolitan counties with populations less than 500,000 also gained labor migrants, with the exceptions of Kern and Modesto counties in California, Lane county in Oregon, and Spokane county in Washington. Similarly, labor migrants shifted from the core counties of the larger metropolitan statistical areas to their suburban periphery counties. More labor migrants moved away from the two largest metropolitan counties in California (Los Angeles and San Francisco) and the largest metropolitan county in Oregon (Multnomah) than labor migrants moved to them in the 1970s. However, in Washington, more labor migrants moved to the largest county (King) than moved away from it.

EMPLOYMENT CHANGE IN THE PACIFIC COAST STATES

This thesis argues that the increased employment growth in the nonmetropolitan counties is not a return to the land movement, rather a result of changes in the employment structure in nonmetropolitan counties. For instance, the total U.S. farm population steadily declined from 23% in 1940 to 3% in 1980 (Brewer, 1981). The loss of agrarian employment was offset by manufacturing job gains in nonmetropolitan counties. By 1970, 25% of all U.S. manufacturing jobs were located in nonmetropolitan counties.

Between 1970 and 1978, nonmetropolitan counties gained an additional 619,000 manufacturing jobs and 3,452,000 service jobs (Beale, 1980).

The above figures hide the diversity of employment opportunities in the nonmetropolitan counties. In 1970, 3.8% of the nonmetropolitan counties had as high as 30% of their labor force employed in agriculture. The majority of these counties were located in the Pacific Northwest, the Mississippi Delta, and the Corn Belt. Another 24.9% of nonmetropolitan counties had between 10 to 19% of their labor force employed in agriculture (Beale, 1980).

THE SPATIAL CONTEXT OF THE PACIFIC REGION

Within the Pacific states of California, Oregon, and Washington live 13% of all U.S. inhabitants. About four fifths of the Pacific region's population live in California. Between 1965 and 1975, the population in the Pacific states increased by approximately 7 million. Twenty-two percent of the region's population increase between 1970 and 1975 was a result of an increase of in-migration.

Morrill, Downing, and Leon (1986) and Stevens (1980) hypothesize continued infusion of in-migration to the Pacific states is for noneconomic quality-of-life reasons rather than economic opportunities. Their survey results and in-depth interviews reveal that ex-urbanites claim that

they moved to the nonmetropolitan counties in the Pacific Northwest and northern California for outdoor recreation opportunities and the slow pace of "rural life," rather than economic opportunities.

Before fully investigating the amenities/income tradeoff, it is necessary first to examine the economic structure of the three states. The economic development literature characterizes the economy of the Pacific states as a dual economy dominated by nonroutine technology-intensive sectors (i.e., aerospace, electronics, and instruments) and resource-intensive sectors (i.e., agriculture, natural resources, and food processing).

The most salient feature of the local economies in northern California, western Oregon, and Washington is the dependency on the wood products industry. The Pacific states have approximately 30% of the U.S. softwood timber stock and approximately one half of the nation's cut softwood sawtimber (Hibbard, 1989; Morrill, Downing, & Leon, 1986; Shapira & Leigh-Preston, 1984).

Yet at the same time the Pacific states are recognized as a well-developed center of industrial innovation with key educational and research institutions (i.e., University of California at Berkeley and Los Angeles; Stanford University in Santa Clara county, CA; and University of Washington in Seattle, WA). Knowledge-intensive (nonroutine) production activities are evident across industrial sectors, i.e.,

aerospace and transportation equipment (Seattle, WA) and electronics and scientific instruments (Silicon Valley in California). In Oregon, Portland's suburban Washington county is now dubbed the Silicon Forest (Hibbard, 1989; Markusen, Hall, & Glasmeier, 1986; Saxenian, 1985).

The duality of the Pacific state's employment structure is reflected in the above national average employment concentration of the nonroutine and resource-intensive industries in the three states (see Table VI). In 1975, California had above national employment average in several knowledge-intensive sectors, in particular electrical machinery (with a location quotient of 1.66) and instruments (with a location quotient of 1.16) (a location quotient is a statistical technique that measure the degree of concentration of an activity [usually employment] in a given industry that is concentrated in a particular place [Heilbrun, 1981]). At the same time, California still had above average employment in its resource sectors, especially the agricultural related sectors (with a location quotient of 1.75) and petroleum and coal products (with a location quotient of 1.14).

The economy in Oregon has less employment concentration in the knowledge-intensive sectors than do the economies of California and Washington. Just one Oregon knowledge-intensive sector, instruments, is above the national employment average (with a location quotient of

TABLE VI

EMPLOYMENT CONCENTRATION: LOCATION QUOTIENTS FOR THE MAJOR INDUSTRIAL SECTORS, 1975

INDUSTRIAL SECTORS	CALIFORNIA	OREGON	WASHINGTON
AGRICULTURAL SERVICES	1.75	2.60	2.02
MINING	0.02	0.05	0.19
CONSTRUCTION	0.92	0.92	1.06
MANUFACTURING	0.88	0.92	0.89
NONROUTINE MANUFACTURING	0.75	1.03	0.80
FOOD PROCESSING,TOBACCO	0.95	1.10	1.09
TEXTILE, APPAREL	0.52	0.24	0.20
LUMBER/WOOD PRODUCTS	0.84	10.40	4.76
FURNITURE	0.97	0.53	0.47
PAPER PRODUCTS	0.56	1.39	1.79
PRINTING PUBLISHING	0.88	0.69	0.71
PETROLEUM COAL PRODUCTS	1.14	0.44	0.97
RUBBER PRODUCTS	0.88	0.23	0.32
LEATHER/LEATHER PRODUCTS	0.38	0.16	0.15
STONE, CLAY, GLASS	0.83	0.57	0.69
PRIMARY METAL	0.45	0.80	0.87
FABRICATED METAL	0.87	0.56	0.43
MACHINERY	0.84	0.68	0.42
MISCELLANEOUS MANUFACTURING	0.84	0.51	0.67
ADMINISTRATIVE	0.65	0.44	0.67
ROUTINE MANUFACTURING	1.28	0.58	1.16
CHEMICAL ALLIED PRODUCTS	0.62	0.26	0.44
ELECTRICAL MACHINERY	1.30	0.23	0.21
TRANSPORTATION EQUIPMENT	1.66	0.47	2.73
INSTRUMENTS	1.16	2.47	0.38
SERVICES			
TRANSPORTATION/PUBLIC UTILITIES	1.12	1.00	0.99
WHOLESALE TRADE	1.12	1.00	0.99
RETAIL TRADE	1.01	1.17	1.14
FINANCE/INSURANCE/REAL ESTATE	1.05	1.11	1.06
BUSINESS SERVICE	1.04	1.03	1.07
CONSUMER AND PERSONAL SERVICES	1.33	0.76	0.95

Source: Calculated from U.S. Census (1975).

2.47). Oregon's resource-intensive sectors continue to dominate the state's economy, especially wood products and agricultural related production. The resource sectors in Oregon, which show above national employment averages, are agricultural services (with a location quotient of 2.60), food processing (with a location quotient of 1.10), lumber/wood products (with a location quotient of 10.4), and paper products (with a location quotient of 1.39).

Washington state has above national employment concentration in one knowledge-intensive sector and several resource-intensive sectors. Transportation equipment shows above the national employment average (with a location quotient of 2.73). The resource sectors that show above national employment averages are agricultural services (with location quotient of 2.02), food processing (with location quotient of 1.09), lumber/wood products (with a location quotient of 4.76), and paper products (with a location quotient of 1.79).

Between the years 1970 and 1975, all three states lost manufacturing jobs. California lost .2% of its manufacturing jobs. Oregon lost about 5.7% of its manufacturing jobs. Washington lost about .3% of its manufacturing jobs (see Tables VII-XI).

TABLE VII

EMPLOYMENT BY MAJOR INDUSTRIAL SECTORS, 1965

INDUSTRIAL SECTOR	USA	CALIFORNIA	OREGON	WASHINGTON
AGRICULTURAL SERVICES	143,747	20,483	2,037	3,375
MINING	596,386	35,196	1,832	2,111
CONSTRUCTION	2,635,673	314,401	30,161	42,900
MANUFACTURING	16,935,412	1,359,818	145,579	215,800
ROUTINE MANUFACTURING	12,540,630	815,548	130,131	134,216
FOOD PROCESSING,TOBACCO	1,613,801	138,991	14,973	21,253
TEXTILE, APPAREL	2,136,952	75,474	5,150	643
LUMBER/WOOD PRODUCTS	565,368	46,409	68,827	42,159
FURNITURE	380,044	32,504	2,756	2,809
PAPER PRODUCTS	583,678	29,156	7,027	18,284
PRINTING PUBLISHING	925,385	78,681	5,316	9,233
PETROLEUM COAL PRODUCTS	150,581	16,441	361	1,316
RUBBER PRODUCTS	417,365	30,832	607	634
LEATHER/LEATHER PRODUCTS	325,985	6,019	276	359
STONE, CLAY, GLASS	563,247	47,903	2,778	5,264
PRIMARY METAL	1,151,851	47,100	5,076	11,366
FABRICATED METAL	1,080,182	91,951	5,159	6,011
MACHINERY	1,527,567	97,821	6,914	8,818
MISCELLANEOUS MANUFACTURING	369,608	23,700	1,629	1,903
ADMINISTRATIVE	749,016	52,566	3,282	4,164
NONROUTINE MANUFACTURING	4,152,194	435,450	15,327	77,108
ORDNANCE AND ACCESSORIES	0	0	0	0
CHEMICAL ALLIED PRODUCTS	748,293	39,884	1,731	8,702
ELECTRICAL MACHINERY	1,465,767	171,199	5,739	2,794
TRANSPORTATION EQUIPMENT	1,627,597	199,568	6,629	65,205
INSTRUMENTS	310,537	24,799	1,228	407
SERVICES				
TRANSPORTATION/PUBLIC UTILITIES	3,099,079	335,434	34,179	46,104
WHOLESALE TRADE	3,324,924	337,376	38,370	53,647
RETAIL TRADE	8,576,011	914,960	92,253	132,016
FINANCE/INSURANCE/REAL ESTATE	2,914,936	318,964	26,462	41,477
BUSINESS SERVICE	1,117,690	165,689	8,675	13,182
SERVICES	6,170,564	683,381	14,148	97,550
TOTAL	45,683,437	4,512,509	448,427	650,512

Source: U.S. Census (1965).

TABLE VIII

EMPLOYMENT BY MAJOR INDUSTRIAL SECTORS, 1970

INDUSTRIAL SECTOR	USA	CALIFORNIA	OREGON	WASHINGTON
AGRICULTURAL SERVICES	189,026	27,103	2,958	4,661
MINING	600,715	36,621	1,387	1,992
CONSTRUCTION	3,197,382	301,086	26,902	50,348
MANUFACTURING	19,761,548	1,608,244	162,791	245,247
ROUTINE MANUFACTURING	14,433,949	969,742	147,534	146,997
FOOD PROCESSING,TOBACCO	1,666,397	142,871	28,406	24,350
TEXTILE, APPAREL	2,324,090	84,184	3,242	6,103
LUMBER/WOOD PRODUCTS	554,835	44,334	61,655	38,406
FURNITURE	445,756	37,911	3,173	3,111
PAPER PRODUCTS	668,087	34,335	8,706	18,642
PRINTING PUBLISHING	1,082,353	90,472	6,295	10,894
PETROLEUM COAL PRODUCTS	136,170	17,048	342	1,419
RUBBER PRODUCTS	558,186	43,358	823	1,418
LEATHER/LEATHER PRODUCTS	304,367	6,864	201	500
STONE, CLAY, GLASS	592,150	47,985	2,628	5,761
PRIMARY METAL	1,268,342	52,741	7,700	14,288
FABRICATED METAL	1,353,513	113,847	7,064	7,461
MACHINERY	1,996,070	154,476	9,907	10,141
MISCELLANEOUS MANUFACTURING	422,329	35,173	2,013	2,687
ADMINISTRATIVE	1,061,304	64,143	5,379	1,816
NONROUTINE MANUFACTURING	4,984,367	638,382	25,122	95,200
ORDINANCE AND ACCESSORIES	343,232	130,367	0	0
CHEMICAL ALLIED PRODUCTS	881,275	46,217	2,649	6,086
ELECTRICAL MACHINERY	1,881,082	210,275	9,907	5,688
TRANSPORTATION EQUIPMENT	1,817,492	215,593	9,915	82,707
INSTRUMENTS	404,518	35,930	2,651	719
SERVICES				
TRANSPORTATION/PUBLIC UTILITIES	3,837,876	409,717	39,296	58,856
WHOLESALE TRADE	4,035,995	397,559	46,286	63,409
RETAIL TRADE	11,071,289	1,140,050	114,393	174,848
FINANCE/INSURANCE/REAL ESTATE	3,674,899	383,455	34,784	57,832
BUSINESS SERVICE	1,869,097	236,457	13,462	20,827
CONSUMER AND PERSONAL SERVICES	8,602,371	917,144	87,669	139,323
TOTAL	57,265,292	5,517,039	535,147	825,801

Source: U.S. Census (1970b).

TABLE IX

EMPLOYMENT BY MAJOR INDUSTRIAL SECTORS, 1975

INDUSTRIAL SECTOR	USA	CALIFORNIA	OREGON	WASHINGTON
AGRICULTURAL SERVICES	195,145	33,794	5,196	5,912
MINING	717,202	1,751	367	2,006
CONSTRUCTION	3,321,173	302,056	31,302	52,857
MANUFACTURING	18,374,397	1,605,211	172,191	244,528
ROUTINE MANUFACTURING	13,856,430	1,032,914	145,488	165,358
FOOD PROCESSING, TOBACCO	1,518,563	142,561	17,062	24,877
TEXTILE, APPAREL	1,997,809	103,637	4,917	5,931
LUMBER/WOOD PRODUCTS	568,166	47,201	60,420	40,540
FURNITURE	395,184	38,066	2,147	2,767
PAPER PRODUCTS	585,344	32,652	8,310	15,679
PRINTING PUBLISHING	1,081,730	93,904	7,675	11,444
PETROLEUM COAL PRODUCTS	145,291	16,346	661	2,121
RUBBER PRODUCTS	587,951	51,333	1,400	2,785
LEATHER/LEATHER PRODUCTS	225,870	8,560	375	516
STONE, CLAY, GLASS	576,648	47,309	3,372	5,979
PRIMARY METAL	1,156,257	51,476	9,448	15,038
FABRICATED METAL	1,400,876	120,475	8,051	9,085
MACHINERY	2,076,434	172,283	14,358	13,153
MISCELLANEOUS MANUFACTURING	405,116	33,642	2,126	4,043
ADMINISTRATIVE	1,135,191	73,469	5,166	11,400
NONROUTINE MANUFACTURING	4,517,967	574,854	26,590	78,438
ORDINANCE AND ACCESSORIES		0	0	0
CHEMICAL ALLIED PRODUCTS	839,116	51,635	2,198	5,577
ELECTRICAL MACHINERY	1,572,884	202,670	3,670	4,858
TRANSPORTATION EQUIPMENT	1,588,215	260,808	7,628	65,086
INSTRUMENTS	517,752	59,741	13,094	2,917
SERVICES				
TRANSPORTATION/PUBLIC UTILITIES	3,935,326	436,506	40,422	58,586
WHOLESALE TRADE	4,332,992	432,858	51,937	73,880
RETAIL TRADE	12,270,957	1,281,554	138,824	195,873
FINANCE/INSURANCE/REAL ESTATE	4,263,362	440,268	45,085	68,610
BUSINESS SERVICE	1,956,452	257,276	15,226	27,843
CONSUMER AND PERSONAL SERVICES	10,701,111	1,117,807	112,360	169,179
TOTAL	60,564,361	5,999,041	619,473	908,305

Source: U.S. Census, (1975).

TABLE X

EMPLOYMENT CHANGE IN PACIFIC STATES, 1965-1970

INDUSTRIAL SECTOR	USA	CALIFORNIA	OREGON	WASHINGTON
AGRICULTURAL SERVICES	45,279	6,620	921	1,286
MINING	4,329	1,425	(445)	(119)
CONSTRUCTION	561,709	(13,315)	(3,259)	7,448
MANUFACTURING	2,826,136	248,426	17,212	29,447
ROUTINE MANUFACTURING	1,893,319	154,194	17,403	12,781
FOOD PROCESSING, TOBACCO	52,596	3,880	13,433	3,097
TEXTILE, APPAREL	187,138	8,710	(1,908)	5,460
LUMBER/WOOD PRODUCTS	(10,533)	(2,075)	(7,172)	(3,753)
FURNITURE	65,712	5,407	417	302
PAPER PRODUCTS	84,409	5,179	1,679	358
PRINTING PUBLISHING	156,968	11,791	979	1,661
PETROLEUM COAL PRODUCTS	(14,411)	607	(19)	103
RUBBER PRODUCTS	140,821	12,526	216	784
LEATHER/LEATHER PRODUCTS	(21,618)	845	(75)	141
STONE, CLAY, GLASS	28,903	82	(150)	497
PRIMARY METAL	116,491	5,641	2,624	2,922
FABRICATED METAL	273,331	21,896	1,905	1,450
MACHINERY	468,503	56,655	2,993	1,323
MISCELLANEOUS MANUFACTURING	52,721	11,473	384	784
ADMINISTRATIVE	312,288	11,577	2,097	(2,348)
NONROUTINE MANUFACTURING	832,173	202,932	9,795	18,092
ORDINANCE AND ACCESSORIES	343,232	130,367	0	0
CHEMICAL ALLIED PRODUCTS	132,982	6,333	918	(2,616)
ELECTRICAL MACHINERY	415,315	39,076	4,168	2,894
TRANSPORTATION EQUIPMENT	189,895	16,025	3,286	17,502
INSTRUMENTS	93,981	11,131	1,423	312
SERVICES				
TRANSPORTATION/PUBLIC UTILITIES	738,797	74,283	5,117	12,752
WHOLESALE TRADE	711,071	60,183	7,916	9,762
RETAIL TRADE	2,495,278	225,090	22,140	42,832
FINANCE/INSURANCE/REAL ESTATE	759,963	64,491	8,322	16,355
BUSINESS SERVICE	751,407	70,768	4,787	7,645
CONSUMER AND PERSONAL SERVICES	2,431,807	233,763	73,521	41,773
TOTAL	11,581,855	1,004,530	86,720	175,289

Note: Parentheses indicates negative numbers.
Source: U.S. Census (1965, 1970b).

TABLE XI

EMPLOYMENT CHANGE IN PACIFIC STATES, 1970-1975

INDUSTRIAL SECTOR	USA	CALIFORNIA	OREGON	WASHINGTON
AGRICULTURAL SERVICES	6,119	6,691	2,238	1,251
MINING	116,487	(34,870)	(1,020)	14
CONSTRUCTION	123,791	970	4,400	2,509
MANUFACTURING	(1,387,151)	(3,033)	9,400	(719)
ROUTINE MANUFACTURING	(577,519)	63,172	(2,046)	18,361
FOOD PROCESSING, TOBACCO	(147,834)	(310)	(11,344)	527
TEXTILE, APPAREL	(326,281)	19,453	1,675	(172)
LUMBER/WOOD PRODUCTS	13,331	2,867	(1,235)	2,134
FURNITURE	(50,572)	155	(1,026)	(344)
PAPER PRODUCTS	(82,743)	(1,683)	(396)	(2,963)
PRINTING PUBLISHING	(623)	3,432	1,380	550
PETROLEUM COAL PRODUCTS	9,121	(702)	319	702
RUBBER PRODUCTS	29,765	7,975	577	1,367
LEATHER/LEATHER PRODUCTS	(78,497)	1,696	174	16
STONE, CLAY, GLASS	(15,502)	(676)	744	218
PRIMARY METAL	(112,085)	(1,265)	1,748	750
FABRICATED METAL	47,363	6,628	987	1,624
MACHINERY	80,364	17,807	4,451	3,012
MISCELLANEOUS MANUFACTURING	(17,213)	(1,531)	113	1,356
ADMINISTRATIVE	73,887	9,326	(213)	9,584
NONROUTINE MANUFACTURING	(466,400)	(63,528)	1,468	(16,762)
CHEMICAL ALLIED PRODUCTS	(42,159)	5,418	(451)	(509)
ELECTRICAL MACHINERY	(308,198)	(7,605)	(6,237)	(830)
TRANSPORTATION EQUIPMENT	(229,277)	45,215	(2,287)	(17,621)
INSTRUMENTS	113,234	23,811	10,443	2,198
SERVICES				
TRANSPORTATION/PUBLIC UTILITIES	97,450	26,789	1,126	(270)
WHOLESALE TRADE	296,997	35,299	5,651	10,471
RETAIL TRADE	1,199,668	141,504	24,431	21,025
FINANCE/INSURANCE/REAL ESTATE	588,463	56,813	10,301	10,778
BUSINESS SERVICE	87,355	20,819	1,764	7,016
CONSUMER AND PERSONAL SERVICES	2,098,740	200,663	24,691	29,856
TOTAL	3,299,069	482,002	84,326	82,504

Note: Parentheses indicate negative numbers.
Source: U.S. Census (1970b, 1975).

A large part of the loss of manufacturing was in the resource-intensive sectors. The resource-intensive sectors in California lost 2% of their total employment. In Oregon, the resource-intensive sectors lost 7% of their employment. In Washington, the resource-intensive sectors lost .3% of their employment.

The major resource-intensive sector in the Pacific states continues to be the wood products sector. The wood products sector was vulnerable to the national recession in the 1970s, especially in Oregon. Oregon's wood product sectors lost about 2% of its employment between 1970 and 1975. However, employment in wood products increased by 6.4% in California and by 5.5% in Washington during the same period.

Another part of the employment losses in manufacturing was related to the employment decline of the U.S. defense industry in 1973-1974. The degree that the economies of the Pacific states is influenced by the health of the defense industry is reflected in the large employment losses in the nonroutine manufacturing sectors between the years 1970 and 1975 (refer to Table XI). The state of Washington lost 21% of its employment in the transportation equipment sector between 1970 and 1975 (primarily due to the cutbacks at Boeing in Seattle, WA). The state of California lost about 11% of its employment in the knowledge-intensive sectors

(primarily in ordinance and accessories and electrical machinery) between 1970 and 1975.

The decline in manufacturing in the Pacific states was partially offset by the employment growth in the service sectors between 1970 and 1975. In California, employment in the retail and the personal service sectors increased by 17%. In Oregon, employment in retail and personal services increased by 24% between 1970 and 1975. In Washington, employment in the retail and personal service sector increased by over 59%.

The industrial restructuring in the Pacific states has not been geographically uniform. Because of disclosure problems found in County Business Patterns, the exact degree of spatial differences is not known, but certain spatial trends are evident from the data (U.S. Census, 1965, 1970b, 1975, 1980b).

1. All the spatial regions (metropolitan > 500,000, metropolitan < 500,000, adjacent nonmetropolitan, and nonadjacent nonmetropolitan counties) gained employment during the turnaround period (see Table XII).

2. In spite, the large losses in resource-intensive manufacturing at the state level in Oregon and Washington, the nonmetropolitan counties gained manufacturing jobs in the turnaround period. However, the relative share of manufacturing employment declined in the nonmetropolitan counties.

TABLE XII

EMPLOYMENT BY MAJOR INDUSTRIAL SECTORS
BY COUNTY TYPES,
1965-1975

	TOTAL EMPLOYMENT	AGRICULTURE	ROUTINE MFG	NONROUTINE MFG	PRODUCER SERVICES	CONSUMER RELATED SERVICES	OTHER
1965							
TOTAL EMPLOYMENT							
METRO > 500,000	4,453,992	15,502	1,144,066	268,336	469,780	1,551,787	1,004,521
METRO < 500,000	573,320	3,957	134,921	2,095	48,743	243,286	140,318
ADJACENT	153,504	2,199	29,687	0	9,949	68,899	42,770
NONADJACENT	394,441	3,749	140,207	0	18,037	146,566	85,882
PERCENTAGE OF TOTAL EMPLOYMENT							
METRO > 500,000		0.3%	25.7%	6.0%	10.5%	34.8%	22.6%
METRO < 500,000		0.7%	23.5%	0.4%	8.5%	42.4%	24.5%
ADJACENT		1.4%	19.3%	0.0%	6.5%	44.9%	27.9%
NONADJACENT		1.0%	35.5%	0.0%	4.6%	37.2%	21.8%
1970							
TOTAL EMPLOYMENT							
METRO > 500,000	5,507,769	20,549	1,316,070	367,305	617,585	2,015,093	1,171,167
METRO < 500,000	690,704	5,732	150,666	5,029	71,436	318,035	139,806
ADJACENT	179,048	2,562	32,498	0	11,818	88,953	43,217
NONADJACENT	437,039	5,100	142,919	0	25,124	183,794	80,102
PERCENTAGE OF TOTAL EMPLOYMENT							
METRO > 500,000		0.4%	23.9%	6.7%	11.2%	36.6%	21.3%
METRO < 500,000		0.8%	21.8%	0.7%	10.3%	46.0%	20.2%
ADJACENT		1.4%	18.2%	0.0%	6.6%	49.7%	24.1%
NONADJACENT		1.2%	32.7%	0.0%	5.7%	42.1%	18.3%
1975							
TOTAL EMPLOYMENT							
METRO > 500,000	5,962,104	23,610	1,252,636	401,571	729,823	2,411,042	1,143,422
METRO < 500,000	835,047	9,323	167,958	9,552	75,632	403,652	168,930
ADJACENT	214,297	4,932	37,342	0	16,179	103,701	52,143
NONADJACENT	501,648	7,583	153,914	0	32,005	218,073	90,073
PERCENTAGE OF TOTAL EMPLOYMENT							
METRO > 500,000		0.4%	21.0%	6.7%	12.2%	40.4%	19.2%
METRO < 500,000		1.1%	20.1%	1.1%	9.1%	48.3%	20.2%
ADJACENT		2.3%	17.4%	0.0%	7.5%	48.4%	24.3%
NONADJACENT		1.5%	30.7%	0.0%	6.4%	43.5%	18.0%

Source: Calculated from U.S. Census (1965, 1970b, 1975).

3. The large metropolitan areas lost routine manufacturing jobs in the turnaround period. The loss of

routine manufacturing jobs was offset with a substantial gain of nonroutine manufacturing and producer service jobs between 1970 and 1975, even with the lost of a substantial number of nonroutine manufacturing jobs between 1970 and 1975 in the Seattle SMSA. The large metropolitan areas also lost employment in the construction and wholesale trade sectors as well between 1970-1975 (refer to the "Other" category in Table XIII).

TABLE XIII

EMPLOYMENT CHANGE BY COUNTY TYPES BY MAJOR INDUSTRIAL SECTORS, 1965-1975

	TOTAL EMPLOYMENT	AGRICULTURE	ROUTINE MFG	NONROUTINE MFG	PRODUCER SERVICES	CONSUMER RELATED SERVICES	OTHER
TOTAL EMPLOYMENT CHANGE							
1965-1970							
METRO > 500,000	1,053,777	5,047	172,004	98,969	147,805	463,306	166,646
METRO < 500,000	117,384	1,775	15,745	2,934	22,693	74,749	(512)
ADJACENT	25,544	363	2,811	0	1,869	20,054	447
NONADJACENT	42,598	1,351	2,712	0	7,087	37,228	(5,780)
1970-1975							
METRO > 500,000	454,335	3,061	(63,434)	34,266	112,238	395,949	(27,745)
METRO < 500,000	144,343	3,591	17,292	4,523	4,196	85,617	29,124
ADJACENT	35,249	2,370	4,844	0	4,361	14,748	8,926
NONADJACENT	64,609	2,483	10,995	0	6,881	34,279	9,971
PERCENTAGE CHANGE IN EMPLOYMENT							
1965-1970							
METRO > 500,000	10.6%	14.0%	7.0%	15.6%	13.6%	13.0%	7.7%
METRO < 500,000	9.3%	18.3%	5.5%	41.2%	18.9%	13.3%	-0.2%
ADJACENT	7.7%	7.6%	4.5%	0.0%	8.6%	12.7%	0.5%
NONADJACENT	5.1%	15.3%	1.0%	0.0%	16.4%	11.3%	-3.5%
1970-1975							
METRO > 500,000	4.0%	6.9%	-2.5%	4.5%	8.3%	8.9%	-1.2%
METRO < 500,000	9.5%	23.9%	5.4%	31.0%	2.9%	11.9%	9.4%
ADJACENT	9.0%	31.6%	6.9%	0.0%	15.6%	7.7%	9.4%
NONADJACENT	6.9%	19.6%	3.7%	0.0%	12.0%	8.5%	5.9%

Source: Calculated from U.S. Census (1965, 1970b, 1975).

4. As in the rest of the nation, the metropolitan and nonmetropolitan counties gained employment in the service sectors.

5. Contrary to the rest of the nation, however, all the regions gained employment in agricultural services.

CHAPTER SUMMARY AND CONCLUSIONS

A new pattern of human settlement patterns emerged in the United States during the late 1970s. The new emergent pattern showed a population movement away from the larger counties to the smaller counties. There appears to be no uniform pattern of dispersion. Some of the nonmetropolitan counties had population decline, while others had population growth during the pre-turnaround and turnaround periods.

Nationally, the population and economic reconcentration in the 1970s reflected the diversity of resources in both metropolitan and nonmetropolitan counties. There was a decline in dependency on basic sectors and a growth in dependency on the nonbasic sectors in the metropolitan counties. In nonmetropolitan counties, there was a decline in dependency on the agricultural sector and a growth in dependency on manufacturing and service related sectors.

In the Pacific states, population and economic reconcentration did not always parallel the national trends. In the Pacific metropolitan areas, there has been employment growth in the producer service sectors and nonroutine

manufacturing sectors. However, there has been no relative decline in the agricultural related sectors in the metropolitan counties.

In the Pacific nonmetropolitan counties, the turnaround in employment growth was not a sign of the resurgence of a farm economy. There has been no significant decline or growth in agricultural related employment. Rather there has been employment growth in service related sectors (i.e., retail trade, wholesale and personal services). There has also been employment growth in manufacturing employment, however, that the relative importance of the population employed in the manufacturing sectors has declined.

CHAPTER III

THE THEORETICAL REVIEW OF MIGRATION LITERATURE

The purpose of this chapter is to synthesize the scholarly works that deal with the forces behind the nonmetropolitan turnaround of people and jobs. The question is why did the turnaround between metropolitan and nonmetropolitan counties occur? Does this turnaround represent a unique departure from previous patterns of movement? To address these questions requires reviewing the structural changes within spatial regions and the responses of individuals living in these regions to structural changes.

The literature on the impact of structural change on migration transcends disciplines, thus this review incorporates economic, geographical, and sociological works.

WHY THE TURNAROUND OF PEOPLE AND JOBS

Frey (1987, 1989) notes the debate on population and economic redistribution evolves from two general theoretical perspectives. A regional restructuring perspective links population redistribution to the industrial reorganization of production. The resultant change in the industrial

structure leads to selective disinvestment in labor-intensive manufacturing in older industrial production centers (i.e., the manufacturing cities such as Akron, Ohio; Buffalo, New York; Gary, Indiana; and Pittsburgh, Pennsylvania). Industrial production has shifted from the older industrial centers to the newer industrial centers, which offer administrative and research and development functions. The new dominant industrial activities in metropolitan regions thus are producer services and high technology industries (Bluestone & Harrison, 1982; Frey 1987, 1989; Noyelle & Stanbach, 1984; Sawers & Tabb, 1984; Scott, 1988a, 1988b; Scott & Storper, 1986; Stanbach & Noyelle, 1982).

The deconcentration perspective links population redistribution to the interaction of residential preferences and firm location decisions (Brown & Wardwell, 1980; Frey, 1987, 1989; Fuguitt, 1985; Hawley & Mazie, 1981). The deconcentration literature does not discount the role of changes in technology and production organization. The emphasis is the increased importance of "residential space flexibility," which results from the development of new technologies and social and production organizations (Frey, 1987).

INDUSTRIAL RESTRUCTURING

Changes in technology and the industrial structure have changed the traditional location criteria for firms. Before World War II, regional scholars note that the northeastern cities were the most favored sites for U.S. manufacturing. The northeastern cities contained two thirds of U.S. manufacturing jobs. Most scholars regard the northeast's early comparative advantage to be a result of the region having deep water ports, a highly developed transport system that allowed easy access to natural resources, an educated labor force, and a large market area. Since World War II, the newer growth industries (i.e., services, aerospace, and electronics) have become less tied to the above traditional industrial location criteria (Kasarda, 1980).

Vernon (1966) explains industrial restructuring according to the region's product cycle. Growth occurs in three stages. The first stage is the incubation stage, which is the result of the presence of an atmosphere that facilitates research and innovation. The second stage is an export expansion stage, which leads to the exporting of the product outside the region. The third stage is a standardization stage, which involves cost minimization moves toward areas of low factor inputs (Vernon, 1966).

According to Thompson (1973), growth in nonmetropolitan counties is a result of a filtering process.

Metropolitan regions are the natural center for new growth industries. The "true economic base" of large metropolitan regions are the scientists and engineers, the universities and research parks, the financial institutions, the public relations efforts, the transportation and communication systems, and the physical infrastructure. This creates an environment for innovation and new products. However, urban areas will not receive a greater proportion of growth in employment. Instead industries will filter through the system of cities:

> most often, the highest skills are needed in the difficult, early stage of mastering a new process, while skill requirements decline steadily as the production process becomes rationalized and routinized with experience. As the industry slides down the learning curve, the high wage rates of the industrially sophisticated innovating areas become superfluous. The aging industry seeks out industrial backwaters where the cheaper labor is now up to lesser demands of the simplified process. (Thompson, 1972, pp. 8-9)

Nonmetropolitan counties are thus expected to acquire the more routine production facilities and low wage industries, while metropolitan counties will continue to give birth to the newer industries and high wage industries. Thompson (1975c) argues, though, that the more remote nonmetropolitan counties will face "one of three fates: depopulation, socio-economic deterioration or economic absorption" (p. 519). Out-migration is the only alternative, unless these areas are within proximity of metropolitan areas.

Heaton and Fuguitt (1979) postulate as industrial production reaches a mature stage in the larger metropolitan areas, the availability of agglomeration effects and skilled labor becomes less important, slow growth industries will "filter down" from industrial locations in metropolitan areas to the nonadjacent nonmetropolitan counties. This filtering down process has become easier, since improvements in transportation and communication networks reduced the friction of movement between regions (Heaton & Fuguitt, 1979).

The change in the industrial structure effects net migration by inducing more industrial expansion and creating new jobs. Heaton and Fuguitt's (1979) study shows nonmetropolitan counties have had a greater rate of manufacturing growth than metropolitan counties have had between 1965 to 1970. However, high wage manufacturing employment continues to grow at a faster rate in the metropolitan and adjacent nonmetropolitan counties, while low wage manufacturing employment grows at a faster rate in the nonadjacent nonmetropolitan counties.

Heaton and Fuguitt's (1979) study indicates that nonmetropolitan counties in the 1950s gained more out-migrants than in-migrants. But by 1970, their study shows that these counties gained in-migrants at a faster rate than metropolitan counties gained.

Heaton and Fuguitt (1979) find that the growth in nonmetropolitan counties is not solely the result of the relocation of manufacturing to nonmetropolitan counties. According to Heaton and Fuguitt:

> manufacturing may have received more attention than it merits as a solution to the problem of nonmetropolitan population decline . . . With the growth of a service-oriented economy, manufacturing will further decline in importance. (p. 134)

Bluestone and Harrison (1982) note that changes in technology and organization of work makes it easier for management to use cheap labor in peripheral regions, such as the U.S. nonmetropolitan regions, the U.S. South, or in regions outside of the United States. Consequently, industrial firms are now able to selectively fragment their production processes to nonmetropolitan counties. The new emerging pattern leads to a deskilling of routine production work in metropolitan counties to the peripheral regions (Bluestone & Harrison, 1982). Thus, it should be expected that routine production manufacturing should decline in metropolitan counties, while routine production manufacturing should increase in nonmetropolitan counties.

Noyelle and Stanbach (1984; Stanbach & Noyelle, 1982) observe that a dual economy is emerging within U.S. regions. Decline in metropolitan regions is a result of a selective disinvestment. Older regional production centers (i.e., Akron, Ohio and Buffalo, New York) increasingly are experiencing slow or declining rates of employment growth

because of rising foreign competition and competition from cheaper U.S. regions. The growing metropolitan centers are those that have administrative functions (i.e., headquarter activities and producer services), distributive functions (i.e., wholesale and transportation services), research and development functions (i.e., high technology manufacturing), and government and nonprofit functions. Strong linkages in the growth centers (i.e., San Jose, California and Seattle, Washington) exist between production activities, administrative activities, and research and development activities (Noyelle & Stanbach, 1984; Stanbach & Noyelle, 1982).

Gottdiener (1985) labels the spatial dispersion from the urban core to the periphery an indication of a locational division of labor:

> Those firms choosing the central city are more likely to be involved in global and administrative activities, while those firms with distinctively regional ties to the metropolitan economy are dispersing along with other activities to the urban hinterland. (p. 56)

Scott (1988a) postulates that the dispersion process from metropolitan to nonmetropolitan counties in the 1970s in United States is a result of a new spatial and international division of labor. Scott notes that the modern industrial firm locates in space according to its different internal functions, i.e., administrative function, skilled specialized nonroutine production or deskilled, routine production. Administrative functions are located in

the larger business complexes in metropolitan regions. The skilled production centers are typically growth centers that possess specialized materials and labor inputs. The deskilled functions are in peripheral locations, where labor costs are low and unionization is weak (Scott, 1988a).

Consequently, the decentralization trend in United States from the larger metropolitan counties results in traditional manufacturing activities shifting to more remote peripheral locations, while the economies of large metropolitan counties increasingly become dependent on such producer services as financial services, business services, and professional services (Scott & Storper, 1986).

Kale and Lonsdale (1979) identify several diverse economic and noneconomic factors that influence plant location decisions in nonmetropolitan counties. These factors are labor availability, labor skills, labor productivity, unionization, transportation, market size, environmental considerations, and energy at the regional level. The more local influences are housing, developed industrial sites, available building, and community liveability.

POPULATION DECONCENTRATION

Kasarda (1980) provides an extensive theoretical work on why the turnaround in migration of jobs and people happened. Kasarda cites both nonemployment and employment

reasons for this change, such as the footloose retirement population whose source of income (social security and private pensions) is not tied to any particular location, changes in technology making it easier for individuals to live in extreme weather conditions, rising real incomes in rural areas, less expensive land, improvements in consumer services, and the extension of the interstate freeway system (Kasarda, 1980).

Hawley (1950) views population pressure as the engine of growth behind urban expansion. The expansion process concentrates administrative functions within urban centers. As an urban center grows, the center extends to the periphery (Hawley, 1950). According to Hawley (1971):

> The centripetal movement has concentrated administrative offices and institutions, the services that cater to administrative tasks, and the retailing of expensive and fashionable commodities in the central business district of the central city. This movement has been associated with a less conspicuous centralization of control over the metropolitan system. The spatial rearrangement is an external manifestation of a functional reorganization of an enlarging community. (p. 171)

Armstrong (1972) empirically examines Hawley's administrative function hypothesis. Armstrong's data shows that by 1970, about one out of every six corporate headquarters are located outside the central city. Sly and Tayman (1980) also find that as the periphery becomes developed, urban administrative functions begin to disperse away from the central business district to the urban periphery. The dispersion process though is more influenced

by the region's relationship to the rest of the national and global economy, than a relationship between the metropolitan area's core and periphery (Armstrong, 1972; Gottdiener, 1985; Sly & Tayman, 1980). In other words, the spillover of metropolitan functions to nonmetropolitan counties located in their peripheral fringe is a phenomenon associated with large metropolitan areas rather than small metropolitan areas.

Berry (1976b) notes that nonmetropolitan growth is a result of the spreading of urban functions into nonmetropolitan regions. The conceptualization of the city itself needs to be redefined. The city is no longer the center of a concentrated cone. A new geographical entity, the urban field, is being created. The urban field is a space that goes beyond the present urban boundaries, with the primary activities oriented toward the city (Berry, 1976b; Friedman & Miller, 1965). This urban field is a fusion of metropolitan and nonmetropolitan counties. Within this region, the distinction between urban and rural gradually disappears. The city is not a physical entity, instead it has become "a pattern of point locations and connecting flows of people, information, money and commodities" (Friedman & Miller, 1965, p. 314).

Wardwell (1977) examines whether the nonmetropolitan turnaround represents an extension or departure from the past urbanization process. His study evaluates whether or

not the cause relates to the presence of an equilibrium in the exchange of population between metropolitan and nonmetropolitan counties, to a change in the composition of the population, to changes in the economic and social structure of nonmetropolitan counties, or to changes in residential preferences.

Residential preferences for smaller places have increased. It should be noted that even though Wardwell's (1977) study finds a preference toward living in smaller places, it is a preference for smaller places within a commuting radius of metropolitan centers. Additionally, declining fertility rates create an age effect on nonmetropolitan growth that may contribute to a decrease in the push effect of nonmetropolitan youth seeking employment opportunities in metropolitan regions.

What needs to be identified are the forces behind the causes of the change. Wardwell (1980) identifies the foremost cause as a "pervasive urbanization." The concept of urbanization is not just a physical space, but also a social organization. "Pervasive urbanization" refers to a society whose:

> urban forms of social organization have so extended themselves in space as to make old distinctions between center and hinterland, urban and rural less meaningful than they have. (p. 73)

Frisbie and Poston (1975) are two of the first scholars to address the relationship between nonmetropolitan population change and economic activities. Their study

focuses on the interrelationship of population change, the sustenance (economic) activities, and the environment. The environmental variables in their study include the racial and age composition and proximity to metropolitan counties. Their empirical results show the nonmetropolitan counties, which are experiencing growth, are counties that are no longer dependent on primary activities (i.e., agriculture and mining). The growing counties' major economic activities are service and food processing activities.

Fuguitt, Voss, and Doherty (1979) analyze the interrelationship of the changing structural characteristics of rural counties with net migration rates. Their results show a greater rate of net migration between 1970-1975 associated with the presence of a state college; interstate freeway system; populations with a higher percentage engaged in manufacturing; higher per capita rankings of hotels, motels, and tourist camps; and a higher percentage of the elderly. An extension of their study shows both the social and physical environmental (i.e., presence of college and climate) and economic variables to be statistically significant with migration (Heaton, Clifford, & Fuguitt, 1981).

Zelinsky (1978) as well focuses on the interrelationship of structural change with net migration in his study of nonmetropolitan population change in Pennsylvania between 1940 and 1975. His study analyzes the

correlation coefficients of population change with net migration, socio-economic status, and distance from the standard metropolitan statistical areas. His analysis discounts the role of traditional economic motivations, socio-economic status, and the friction of distance in recent migration. Although the aggregate results of the study supports the hypothesis of population deconcentration, he notes there is a trend more toward reconcentration than deconcentration. Separating the nonmetropolitan counties by proximity to metropolitan areas reveals two distinctive patterns of population reconcentration. The first pattern is the emergence of an inner zone (25 to 35 miles distance SMSA), and the second new pattern is the emergence of new centers in the outer zone. The inner zone is attracting migrants from metropolitan counties and the nonadjacent nonmetropolitan counties. Growth in the outer zones is related to the presence of institutions of higher education and recreational facilities.

William's (1981b) study of midwestern migration examines the interrelationship of nonmetropolitan population growth, employment related factors, and scenic amenities. Williams tested the hypothesis of whether or not the turnaround phenomenon is a result of employment related factors or scenic amenities (i.e., percentage of forest land and four-year colleges/universities present). His data consist of aggregate five-year gross migration data for

state economic areas. His work, unlike previous research, addresses the interrelationship of migration and employment. His study includes such amenities as military population, percentage land forested, presence of a four-year university, and a measure of proximity to metropolitan areas. The amenity variables perform poorly compared to the economic variables in his model results.

Bradbury, Downs, and Small (1982), on the other hand, do not focus on nonmetropolitan growth, but on why urban decline is happening. They postulate urban decline has two meanings: descriptive and functional. Descriptive decline "refers to any decrease in such measures of size as population or employment" (p. 18).

Functional decline refers to "changes that impair the functioning of a city or other urban agglomeration" Bradbury, Downs, & Small, 1982, p. 18), such as support systems, creative innovation, residential environments, and economies of scale. To test this theory, their study examines 121 metropolitan areas between 1970 and 1975 to determine whether descriptive or functional decline happened. The variables selected to measure descriptive decline are employment and population. The variable for per capita income change measures functional decline. The cross section regression results show that population growth and employment are strongly related. It is unclear which comes

first. Firms tend to stay in cities where incomes are growing and where the economic base is diversifying.

Wardwell and Gilchrist (1980) studied both metropolitan and nonmetropolitan counties to determine the causes of economic concentration and the population turnaround. The attention of their study is on the relationship of net migration rates with the characteristics of metropolitan and nonmetropolitan counties and the role of employment. Their study combined the Continuous Work History Sample and the Human Resources Profile to obtain shifts in employment location. County characteristics are related to the size of counties, i.e., whether large, medium or small metropolitan, or nonadjacent or adjacent nonmetropolitan counties to SMSAs. Their analysis shows a negative correlation between size and migration rate (the larger the size, the smaller the in-migration rate). As for nonmetropolitan counties, all sizes and types of counties whether adjacent or nonadjacent had positive net migration rates. Although Wardwell and Gilchrist set out to study the relationship between employment and county characteristics, their study does not examine the relationship between diversity of the employment structure or the amenities with migration flows.

MOTIVATIONS FOR MIGRATION: THE INDIVIDUAL'S RESPONSE TO STRUCTURAL CHANGE

There are numerous studies on the motivations of migrants. Previous migration studies in 1946 and 1963 show the primary motive for all moves is job related (Lansing & Mueller, 1967; U.S. Dept of Census, 1966). Employment versus nonemployment factors depend upon such migration characteristics as age, education, income, and sex. Employment moves are related positively to education, income, and occupation status (Roseman, 1983).

A more recent study by Long and DeAre (1980) still finds the primary motive for metropolitan to nonmetropolitan moves to be job related, followed by closeness to relatives, family related reasons, and retirement. However, Williams and Sofranko's (1979) study of the Midwest shows environmental influences to be the prime motive for leaving metropolitan counties, while nonmetropolitan migrants move for job related reasons.

Fuguitt, Voss, and Doherty's (1979) study examining the motivation of nonmetropolitan migrants in the Upper Great Lake region reveals both employment and nonemployment reasons for migrants leaving their place of origin. For nonmetropolitan migrants under the age of 50, the primary reason for moving to a place is job related. The next most cited reason is previous ties to other places, and then anti-urban reasons are listed. For migrants over the age of

50, the major reason for leaving a place is retirement and the major criteria of selection is previous ties to a place.

Stevens' (1980) research differs from Fuguitt, Voss, and Doherty's (1979) research. The goal of his study was to determine consumer revealed preferences for public goods, such as safety, congestion, air quality, and family recreation. To do this, Stevens used both hedonic price and utility function models to test his survey results. His results show migrants to Jackson and Josephine counties in Oregon, actually make modest income sacrifices in order to gain environmental amenities.

CHAPTER SUMMARY AND CONCLUSIONS

Although the literature on why migrants move to nonmetropolitan counties is extensive, the results are not comparable. The most frequently cited reasons for moving, such as environmental push, employment, social ties, environmental pull and retirement, are found across nonmetropolitan regions from studies on the Ozarks, Midwest, Ohio, and Oregon (Fuguitt, Voss, & Doherty, 1979; Kuehn, 1979; Roseman, 1983; Sofranko & Williams, 1980; Stevens, 1980). Most studies, according to Fuguitt, Voss, and Doherty, lack " . . . comparable information about persons outside the survey boundaries and in particular, they tell us nothing about the counterstream" (p. 35).

Field surveys give elaborate responses to questions why a person moved to an area, but the results of these surveys do not explain why the turnaround happened, nor what factors made it possible for migrants to move to an area and obtain "the rural amenities."

Nor does the economic literature explain the turnaround. Recent economic studies point to the decline of employment variables as determinants in migration (Fuguitt, Voss, & Doherty, 1979; Lansing & Mueller, 1967; Wardwell & Gilchrist, 1980). Frequently, these studies cite that the labor migrant is making tradeoffs between his preferred environment and wages (Mazek & Laird, 1974; Stevens, 1980). The regional development literature postulates that nonemployment factors, such as physical environment and community liveability, affect the location choice of firms (Kale & Lonsdale, 1979; Kasarda, 1980). The problem in studying the turnaround of jobs and people in the 1970s, however, is that traditional economic theory cannot explain the relevance of amenities and accessibility.

To address this problem requires developing a research model that examines the relationship between employment factors and nonemployment factors. From the literature review presented in this chapter, the nonemployment factors can best be categorized as the socio-physical environment and accessibility. The socio-physical environment consists of site and situation factors that influence the local

employment opportunities and residential preferences, such as socio-economic status, recreational amenities, education facilities, and climate (Frisbie & Poston, 1975; Fuguitt, Voss, & Doherty, 1979; Karp & Kelly, 1971; Sly, 1972).

CHAPTER IV

MODEL SPECIFICATION FOR LABOR FORCE MIGRATION AND ECONOMIC DECONCENTRATION

This chapter describes the research model used to examine the determinants of labor force migration and economic deconcentration in the three Pacific states. The theoretical basis of the research model is an integration of economic, geographical, and sociological works on migration. The first section of this chapter outlines the theoretical foundations of the research model. The second section presents the research hypotheses to be examined in this study. The third section discusses the variables to develop the research model. The fourth section outlines the data collection process for this study.

The conceptual approach in this study comes from the human ecological school. The human ecology literature provides a framework for analyzing the relationship between population, the environment, sustenance (economic) organization, and technological change (Duncan, 1959).

Human ecology, which is a subdiscipline within sociology, examines the relationship of human communities interaction with their surrounding environment (Hawley, 1968). The primary focus of human ecology is on the functional systems that exist within a population.

The four distinctive aspects of human ecology relevant to population studies are:

1. Human organizations evolve from the interactions between population and its environment.

2. Population is the point of reference for study of human organizations.

3. Human organizations, themselves, are closed systems.

4. The components of the ecological system move toward equilibrium.

This movement occurs in a series of sequential steps. However, a steady state equilibrium will never occur, only an approximation or new equilibrium happens. In other words, the system is not static, but a moving system.

The population within a community consists of the aggregate of the individuals. The environment consists of the site and situation factors that affect the community. Site factors are physical (such as climate, land, or forest). Situation factors are social (such as racial mix of population, cultural or education facilities in a community or amount of schooling completed). The sustenance organization consists of those activities from which the population obtains its livelihood.

The relevance of human ecology for migration research is its theoretical assertion that population redistributes itself either through changes in fertility and mortality or

through migration to achieve an equilibrium between population size and economic survival (Hawley, 1968, p. 331). A refinement of the population hypothesis is that population redistribution is a direct "demographic response to differences in sustenance organization" (Sly, 1972, p. 615). In brief, economic activities have a direct influence on migration.

Frisbie and Poston (1975) assert the influence of economic activities on migration depends on the nature of the sustenance activity, i.e., whether the activity is agricultural, mining, manufacturing, or services. The population within a community changes according to whether the economic activities decline or grow.

The variables used to represent the ecological complex for the turnaround in labor force migration in this study are labor migration flows, economic activities, accessibility, and socio-physical environment (see Figure 4).

To understand the migration process, one must examine the structural characteristics of the nonmetropolitan counties. The literature review shows little differences between nonmetropolitan and metropolitan living. In the United States, nonmetropolitan counties have become urbanized.

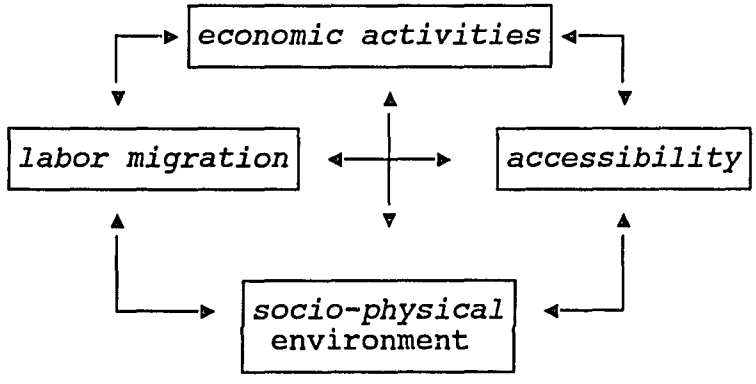

Figure 4. The ecological relation of labor migration.

The following section discusses how the socio-physical environment, accessibility, and economic activities should affect the migration process.

HYPOTHESES

First, the relevance of income has declined because of changes in the employment structure. The location of manufacturing activities is no longer a function of traditional location criteria. Between 1960 and 1970, the growth rate of manufacturing was 9.9% in metropolitan counties and 27.5% in nonmetropolitan counties. Between 1970 and 1980, employment in manufacturing grew at a slower rate in metropolitan counties than it grew in nonmetropolitan counties (7.7% compared to 20.7%). This increase in manufacturing employment in nonmetropolitan counties generated additional employment in the service and retail sectors. It is these diversified opportunities that allow residents, in-migrants, and returnees to the

nonmetropolitan counties in the Pacific states to reside in locales which offer their preferred living conditions.

Second, the presence of physical and social amenities attracts labor in-migration. The preference literature on nonmetropolitan counties reveals a potential reservoir of movers to nonmetropolitan counties who desire to move away from or escape from the disamenities in the larger metropolitan counties.

Third, an expansion of service related activities leads to increased labor in-migration in nonmetropolitan counties. The expansion of service related activities will create a wider range of goods and services, making smaller communities more attractive as centers for shopping and consumer and social services. In brief, the increased growth of retail services, consumer and social services, and entertainment services should provide new and old residents in nonmetropolitan regions the opportunity to acquire more urban services.

Fourth, the presence of interstate highways leads to an increase in employment activities. The completion of the Pacific coast's interstate freeway system in the 1960s facilitates both personal and business interaction over a wider range of space. The improved access for nonmetropolitan counties closely connected to the freeway permits relocation of manufacturing and other economic

activity away from the traditional metropolitan centers of industry and commerce.

What are the hypothesized county characteristics that makes one area more attractive than another county to labor migrants? The following section outlines what are the expected relationship between the individual variables in the research model with labor migration and employment growth.

ENVIRONMENTAL AMENITIES ATTRIBUTES

1. Socio-Economic Amenities. The areas that are growing are areas with better "perceived" quality-of-life. Lower crime rates, the presence of local four-year colleges, and a small percentage of nonwhite population are the variables most frequently mentioned in the literature that represent the "quality-of-life" attributes that attract labor migrants.

2. Physical/Leisure Related Amenities. The presence of physical amenities, such as recreational opportunities and climate, attracts labor migration flows. If labor migrants are moving to nonmetropolitan counties to acquire an outdoor quality-of-life, then labor migration flows should be positively associated with recreational opportunities and negatively associated with adverse climate.

3. Cost of Living. Higher costs of living have a negative influence on labor flows to nonmetropolitan counties. A major component of cost of living is housing, which on the average accounts for 25-35% of all household expenditures. Nonmetropolitan counties that have higher labor in-migration should be the counties with lower housing costs.

4. Areal Income Differentials. Areal income differentials do not have a significant effect on labor in-migration to nonmetropolitan counties. However, labor in-migration to large metropolitan counties should be related to income differentials.

5. Unemployment. Unemployment will have a negative influence on labor migration flows. One of the basic assumptions of the neoclassical economic model is areas that lack job opportunities are the least attractive to labor migrants (Borts & Stein, 1964). A measure of the lack of job opportunities is the level of unemployment in a region (Greenwood, 1981).

ACCESSIBILITY

1. Labor Potential Index. The potential for the interaction of labor flows leads to an increase in labor migration. The potential interaction of labor migration flows between two regions is a function of the population size of the two regions. The underlying assumption of a

spatial interaction model is that the potential volume of interaction between the two regions is inversely related to the distance between the two regions. This study calculates the potential index by multiplying the populations of the two regions and then dividing by the physical distance that separates the two regions.

ECONOMIC ACTIVITIES

1. Employment Availability. An increase in manufacturing and service employment leads to an increase of labor in-migration and a reduction of labor out-migration in nonmetropolitan counties, primary agriculture ceases to be a dominant activity, and manufacturing and services become the dominant activities.

3. Controlled Access Highways. Proximity to better high quality controlled access highways leads to increased employment activities because it reduces the transaction costs for exchange of goods and services between metropolitan and nonmetropolitan counties.

3. Production Input Factors. Low cost production factors, such as wage rates and industrial energy rates, lead to an increase in employment activities, and thus make the region more attractive to labor in-migrants.

4. Goods and Services. The availability of a wide range of goods and services makes a community more attractive to labor migrants. One indicator of the quality

of goods and services is the proportion of consumer services (nongovernmental) and retail employment divided by the total population. This measure will capture both the relative consumer amenities and service employment available to the population.

5. Elderly Population. A large percentage of population of 65 and over leads to an increase of nonbasic employment growth, which leads to increased labor in-migration. Population growth of persons over 65 adds to the county's population and income base (with their retirement and social security pensions) because their spending creates a multiplier effect, which leads to more job opportunities available for labor in-migrants.

MODEL SPECIFICATION

The following section discusses the specifics of how the research model is implemented. The unit of observation is the interaction of labor flows between counties in California, Oregon, and Washington. The model is a disaggregate flow model with four dependent variables: labor in-migration flows, labor out-migration flows, basic employment growth and nonbasic employment growth. The criteria for selecting attribute variables evolves from the human ecological model. The disaggregated flow model for this study specifies the relationship between labor migration flows and the attribute variables is as follows:

Labor In-migration Flows = F(environment, employment activities, and accessibility).

Labor Out-migration Flows = F(environment, employment activities, and accessibility).

Variable Selection

As noted by other studies, labor migration flows are responsive to both quality-of-life variables and economic opportunities (Cebula & Vedder, 1973; Liu, 1975a). Operationalizing amenity and economic opportunities variables, however, is very subjective. Liu specifies quality-of-life variables with both economic and noneconomic components. His economic indicators include such measures as community economic health, material wealth, and goods and services. Liu's noneconomic variables include measures of the physical environment, and political and social factors. In brief, Liu's quality-of-life index does not separate economic and noneconomic variables. The thesis of this study is that social and physical quality-of-life variables are the noneconomic site and situation factors in a county, and that economic variables are the sustenance activities within a county.

This study specifies the social and physical environmental variables as site and situation factors. The site factor used to measure environmental amenities is the recreational opportunities index. The situation factors used in this study to measure environmental amenities are

enrollment in four-year institutes of higher education, the relative county income differences as measured by the ratio of the median income in the county and the median national income, and the average number of years of education completed. The site factors used to measure environmental disamenity variables is the combination of heating degree days and cooling days. The situation factors used to measure environmental disamenities are crime index, age dependency, and the economic health variables. The economic health variables used for this study are unemployment and relative housing costs (Fuguitt, Voss, & Doherty, 1979; Frisbie & Poston, 1975; Karp & Kelley, 1971; Sly, 1972).

The recreational opportunities index measures the outdoor recreational attractiveness. The index is derived from a factor score index that combines the supply and demand activities for outdoor recreation in the individual counties. The data source for supply activities is the State County Outdoor Recreation Plans (SCORP) for California (California Department, 1979; Center for Continuing, 1982), Oregon (Oregon State Highway, 1967; Oregon State Parks, 1983), and Washington (Washington State Interagency, 1983). These reports provide information on the supply of such facilities as community and neighborhood parks, swimming pools, boating ramps, biking trails, golf holes, and number of picnic tables, etc. Due to the inconsistency in reporting demand activities, this study uses reports from

various state agencies and the SCORP reports to calculate participation rates for recreational activities (i.e., hunting/fishing, boating, swimming, hiking and picnicking) to measure the demand variables. The outdoor recreation index is the aggregation of the factor scores for each of the demand and supply components of recreational activities.

The accessibility variables in this dissertation are labor potential, contiguity, and population size. Traditionally distance is used in migration models as a measure of accessibility. Distance serves as a surrogate measure of psychic, information, and social costs to migration.

This study modifies the spatial interaction model to develop a labor potential index. Population size is a measure of potential employment. The numeric expression is based on Duncan's (1959) population potential index.

The specification of the labor potential index in this dissertation is as follows in Figure 5.

The lack of agreement in the literature as to the correct specification of the distance exponent creates a problem in calculating the above index. Numerous scholars use ordinary least squares (OLS) to estimate the distance coefficient in the spatial model (Ballard & Clark, 1981; Carrothers, 1956; Fotheringham & Webber, 1980; Sheppard, 1979). Knowledge of this distance coefficient is

"potentially the most important aspect of a gravity model parameter estimate" (Fotheringham & Webber, 1980, p. 33).

$$L_{ij} = \underline{f}(P_i, P_j, d_{ij}).$$

$$L_{ij} = \frac{k \sum_{i=1}^{N} P_i P_j}{\sum_{i=1}^{N} d_{ij}^{B}}$$

where L_{ij} = labor potential index

P_i = population of origin county

P_j = population of destination county

d_{ij} = distance between i and j

B = distance exponent

Figure 5. Labor potential index.

Thus, the method used to obtain the most reliable estimate for the distance coefficient must be one that minimizes spatial biases. Sheppard (1979) concludes the:

> spatial autocorrelation in the "mass term" of a gravity model produces a nonlinear relationship between the independent variables of a log-linearized gravity model, biasing its OLS estimates. (p. 131)

Sheppard proposes that various functions relating to distance and attractiveness could be separated and perhaps accurately estimated by nonlinear least squares (p. 131).

For this study, it is proposed to estimate the distance coefficient for the labor potential index by using the following nonlinear model:

$$\text{Labor Potential} = \beta_0 + \beta_1 * \ln P_i + \beta_2 * \ln P_j - \beta_3 * \ln d_{ij} + \varepsilon$$

The value of the distance coefficient (β_3) in the labor potential index for each of the origin and destination interactions thus is the estimated value that results from the calibration of the above nonlinear model. This may create a problem in the overall labor flow model, since the dependent variable to calculate the distance elasticity is labor flows. However, the mass term of the labor potential model is independent of labor flows. The advantage of calculating the labor potential index is that each pair of interactions has a unique value. This is the only variable in the model that varies with the number of cases.

There is a problem using a log linear transformation between points that have zero interactions, since the logarithm of zero is undefined. Some researchers suggest that zero interactions be dropped, but this solution would overlook the low volumes of interaction between certain origins and destinations. The most commonly used solution for zero interactions is to add a constant term to the zero flows (Fotheringham & O'Kelly, 1989; Sen & Soot, 1981). Sen and Soot argue that 0.5 is the appropriate constant term for zero interactions (Fotheringham & O'Kelly, 1989).

Another concern in spatial modelling is that moves between adjacent counties may be a function of the tendency of similarity between neighbors rather than the distinct spatial characteristics of two regions. To determine whether adjacency has a significant influence on labor migration flows, a dummy variable, contiguity, is used to represent moves between counties that are adjacent to each other. If a move is between adjacent counties, the dummy value is one. If the move is not between adjacent counties, the dummy value is zero.

This study specifies the economic activities by whether it is a basic activity or nonbasic activity. The basic activities are employment opportunities, relative wage rates (the ratio of a county's wage rates to the national wage rates), industrial energy costs, and access (the presence of controlled access highways). Nonbasic activities are employment opportunities, relative wage rates, and the proportion of the population over 65.

Basic activities are those economic activities that are oriented to the external demand for the produced goods, i.e., manufacturing. Nonbasic activities are those activities that are oriented toward serving the internal demand of the region's population, i.e., services (see Table XIV).

TABLE XIV

INDUSTRIAL CLASSIFICATION USED TO IDENTIFY EMPLOYMENT ACTIVITY VARIABLES

BASIC ACTIVITIES	NONBASIC ACTIVITIES
Agricultural Services	Consumer and Personal Services
Routine Manufacturing	Retail Trade
Food Processing	Services
Tobacco Manufacturing	(Excluding Business Services)
Lumber and Wood Products	
Furniture and Fixtures	Government Services
Paper and Allied Products	Local
Printing and Publishing	State
Chemicals and Allied Products	Federal
(Excluding 282)	
Petroleum and Coal Products	
Rubber and Misc. Plastics	
Leather and Leather Product	
Stone, Clay, and Glass Products	
Primary Metals	
Fabricated Metals	
Machinery, Except Electrical	
(Excluding 357)	
Electric and Electronic Equipment	
(Excluding 362, 366, and 367)	
Transportation Equipment	
(Excluding 372)	
Instruments and Related Products	
(Excluding 381, 382, 384, 385)	
Nonroutine Manufacturing	
Health Related	
Electronics	
Defense Related	
Instruments	
Producer Services	
Financial Services	
Business Services	
(SIC 73, 81, 82, 86)	

Activities are classified according to whether they are basic or nonbasic using a modified export base model approach. However, there are several weaknesses in using export base models. One is the inability to identify exactly which economic activities are basic and nonbasic (Isserman, 1977). The usefulness of export base models is limited by the assumption that requires growth to be primarily a function of exports. Additionally, the model has other restrictive assumptions such as not considering size of an area, feedback effects, and agglomeration economies. Nevertheless, scholars think the model is useful as a descriptive tool for understanding metropolitan and nonmetropolitan employment change (Kale, 1989).

This study categorizes manufacturing activity by whether its production activity is routine or nonroutine (see Table XV). As used here, routine manufacturing includes the traditional manufacturing industrial sectors, i.e., lumber/wood products, food processing, primary metals and fabricated metals. Nonroutine manufacturing includes the knowledge-intensive production sectors. According to the product cycle theory, routine manufacturing activities should filter from the large metropolitan counties to the nonmetropolitan counties (Rees, 1979; Thompson, 1975a, 1975b, 1975c). In contrast, nonroutine manufacturing should agglomerate in metropolitan regions.

TABLE XII

IDENTIFICATION OF VARIABLES USED TO MEASURE NONROUTINE MANUFACTURING

SIC CODE	INDUSTRIAL SECTORS
Health Related	
282	Plastics
283	Bio-Products
Electronics	
357	Electronic Computing, Scales/Balances
362	Industrial Controls
366	Radio and TV Transmitting
367	Electronic Components and Connectors
Defense Related	
372	Aircraft Parts and Equipment
Instruments	
381	Engineering, Lab and Science
382	Scientific Instruments
384	Dental and Orthopedic Instruments
385	Othalmic Equipment

Source: Office of Technology Assessment (1984).

This study argues that producer services such as financial services, banking, and professional services serve not just the local economy but serve the national economy as well. Therefore, this study refines the basic and nonbasic dichotomy by recognizing the changes in the export base. The thesis of this study is that growth in nonbasic services is not the cause of the resurgence of nonmetropolitan counties. The resurgence is dependent on the growth in the basic sectors. Local economic activities are compared to the national levels to determine the relative increase or

decrease of employment opportunities available to the population. If the region's employment growth rate is similar to the national growth rate, the region would not offer any comparative economic advantage. The decision to use population as the base for comparison is determined by the need to examine per capita distribution of such amenities as consumer goods and services and employment opportunities (see Figure 6).

Employment Growth = f(Employment, Wages, Unemployment)

$$\text{where employment} = \frac{\text{local employment in sectori/ local population}}{\text{national employment in sectori/ national population}}$$

$$\text{wages} = \frac{\text{local average wage rate}}{\text{national average wage rate}}$$

$$\text{unemployment} = \frac{\text{local prospective unemployment}}{\text{national prospective unemployment}}$$

Figure 6. Employment growth specification.

This study uses location quotients to describe whether the employment growth in the counties of the Pacific states offers relatively more employment opportunities than the rest of the United States. The focus of this study is not to identify export based activities, but to determine whether the employment activity has a greater level of concentration than the rest of the nation.

By using location quotients, one can determine which employment sectors have relatively more employment in a

particular county than the rest of the nation. According to export base theory, the sectors that have relatively more employment concentration in a county than the rest of the nation are the sectors that export products and services (Perloff & Wingo, 1961). Perloff and Wingo postulate that as a region expands its markets

> . . . its region-serving activities proliferate, conditions may develop for self-reinforcing and self-sustaining regional growth and new internal factors may become important in determining the rates of regional growth, such as external economies, associated with social overhead capital and agglomeration of industries, and internal economies of scale. (pp. 200-201)

Employment growth in a region, therefore, depends not just on a region's internal demand, but demand in the rest of the nation as well (Weinstein, Gross, & Rees, 1985). Regional scholars view the recent growth in the South and the West in the 1970s as support of the export base hypothesis. Nationwide demand of energy products induces regional employment growth through its strong linkages to other sectors in the energy rich states (i.e., Texas, Oklahoma, and Louisiana).

Some proponents of the export base theory argue that a sign of regional decline is when more residents in a region become dependent on the nonbasic sector for their livelihood than on the primary (i.e., mining and agriculture) and secondary sectors (i.e., manufacturing) sectors (Miernyk, 1977).

Problems Encountered in Migration Modelling

The causality problem is a major problem associated with migration modelling. Since Muth (1972) first addressed this causality problem in labor migration, others found similar problems in spatial models as well (Fotheringham & Webber, 1980). Greenwood's (1975, 1981) research shows that migration to metropolitan areas is self-reinforcing, there exists an interrelationship between in- and out-migration and employment growth, which makes it difficult to determine which comes first.

Chalmers and Greenwood (1977) postulate that migration to nonmetropolitan counties is self-reinforcing. Regions with higher rates of employment growth attract in-migration and regions with higher rates of in-migration attract economic growth. In other words, the Keynesian multiplier effect generates more income and thus more employment opportunities. This is consistent with Myrdal (1957) and Olvey (1972) who hypothesize that in-migration may stimulate growth and out-migration may contribute to further decline in sending regions.

To overcome the multi-dimensional problems of modelling labor migration and employment growth, this study specifies a system of simultaneous equations for labor in-migration flows, labor out-migration flows and employment growth. Quite often in demographic and economic modelling, the migration process is best represented with a series of

simultaneous equations. This type of model treats employment and migration as simultaneously determined by the interactions of migration flows and employment in a spatial region. Previous migration studies find the ordinary least squares estimation of individual equations for migration and employment growth leads to biased and inconsistent parameters (Greenwood, 1975; Muth, 1971).

The two stage least squares method provides a method for obtaining values for structural equations in overidentified equations (equations in which there exist no unique estimation). To solve the simultaneous equations, the two-stage least squares method does two basic steps:

1. First, it creates an instrument variable from its predetermined variables. For the migration model, two-stage least squares estimation creates an employment growth model based upon its predetermined variables (employment opportunities, wage rates and utility costs).

2. Second, in the next stage, ordinary least squares uses the estimated employment growth variable to estimate the migration model.

Specifying the Model to be Examined

The following section describes the labelling of the variables used in this study. The operationalized model for this dissertation will be specified according to the

following relationships (exogenous variables are inside parentheses):

In-migration = F(Out-migration, Basic Employment, Nonbasic Employment, (Environmental Amenities, Environmental Disamenities, Accessibility))

Out-migration = F(In-migration, Basic Employment, Nonbasic Employment, (Environmental Amenities, Environmental Disamenities, Accessibility))

Basic Employment = F(In-migration, Out-migration, Nonbasic Employment, (Agricultural, Manufacturing, Producer, Energy, Wages, Freeway))

Nonbasic Employment = F(In-migration, Out-migration, Basic Employment, (Personal Services, Retail, Government, Retirement, Wages))

Labelling of Individual Variables

The following section lists the labels for the variables to be used in this study.

Endogenous Variables:

In-migration = Number of Labor in-migrants

Out-migration = Number of Labor out-migrants

Basic = Change in basic employment growth in five year period

Nonbasic = Change in employment growth in consumer services and retail trade sectors in five year period

Predetermined or Exogenous Variables:

Environmental Amenities Variables:

College = College enrollment in four-year institutes of higher education

Expenditures = Educational expenditures per pupil

Recreation = Recreational opportunities index

Income = Income structure

Environmental Disamenities Variables:

Age = Age dependency ratio

Unemployment = Employment potential

Crime = Crime rate per 1,000

Climate = Climate (number of heating/cooling degree days)

Nonwhite = Percentage of population who is nonwhite

Housing = Value of housing unit

Accessibility Variables:

Freeway = Presence of interstate freeway

Contiguous = Contiguous status, whether moves are to adjacent county

L_{ij} = Labor potential index

Economic Activity Variables:

Basic Employment Variables:

Agriculture = Percentage local agricultural sector/percentage national agricultural sector

Routine Manufacturing = Percentage local manufacturing sector/percentage national manufacturing sector

Nonroutine Manufacturing = Percentage local manufacturing sector/percentage national manufacturing sector

Producer = Percentage local business sector/percentage national business sector

Wages = Local average wage rate/national average wage rate

Energy = Industrial energy rate

Nonbasic Employment Variables:

Retail = Percentage local retail sector/percentage national retail sector

Service = Percentage local consumer sector/percentage national consumer sector

Government = Percentage local government sector/percentage national government sector

Wages = Percentage local average nonbasic wage rate/percentage national average nonbasic wage rate

Retirement = Percentage population over 65

DATA SOURCES

The data source used for labor migration flows is the Continuous Work History File developed from Social Security Records (U.S. Economic, 1976a). The Social Security Administration compiled the data for counties and maintained the data annually from the years 1957 to 1975 (U.S. Economic, 1976b).

There are several limitations associated with this data file. The data file provides only geographical changes in employment and does not include changes in county of residence. Another problem is that the Social Security system covers only 90% of the labor force. Excluded from the data base are workers entering or leaving the labor force. The file has also been found to include errors in the self-reporting of employers. In particular, multi-plant firms do not give the correct breakdown of employment for each plant. In addition, the data file contains coding and clerical errors (Wardwell & Gilchrist, 1980).

The CWHS (U.S. Economic, 1976a) is appropriate for this study, since the main purpose is to study labor force migration not population migration. Other geographical files such as the Current Population Surveys and the Internal Revenue Service data show similar patterns of labor migration as the CWHS data file shows (Wardwell & Gilchrist, 1980). The advantage of using CWHS or the Internal Revenue Service data is that counties are the unit of analysis.

According to Wardwell and Gilchrist (1980), the greatest strengths of the CWHS file have not, been tapped

> . . . when CWHS data are combined at the county level with data sets that provide detailed characteristics of counties of origin and destination, they can very effectively be used to categorize counties by examining the relationships between the resulting typologies and the numbers and the types of employed migrants who are changing their employment location from one county to another. If county population centroid is one of those characteristics, control over distance of

> moves over a given minimal distance, the question of residential mobility can be addressed. Thus, for example, if analyses were restricted to changes that involved 100 miles or more between county centroids, commuting between old residence and new employment location would not be an issue. (p. 155)

The CWHS file allows a researcher to focus on the determinants of labor force migration rather than population migration. Population and labor force migration flows may respond differently to conditions that prevail at the origin or destination. According to Isserman, Plane, and McMillen (1982), the CWHS migration file . . . "offer[s] a picture of labor force flows unobscured by changes in residence and by the movements of the retired elderly, of college students, and of young children" (p. 286).

SECONDARY DATA COLLECTION PROCESS

The socio-economic variables were collected from various secondary data sources, state and local government agencies, and private/public utility agencies. The utilization of these data in the research process is outlined below.

The data used to estimate the two labor change equations came from four primary sources: U.S. Census County Business Patterns (1965, 1970b, 1975, 1980b), U.S. Census City County Data Book (1962c, 1967c, 1972c, 1977c), state employment reviews for California (California Department of Employment, 1965, 1970, 1975), Oregon (Oregon Employment Division, 1965, 1970, 1975, 1980), and Washington

(Labor Market, 1965, 1970, 1975), and Federal Statistics for Publicly and Privately Owned Utilities in the United States (U.S. Energy, 1965, 1970, 1975).

Data for private sector employment come from the County Business Patterns data series (U.S. Census, 1965, 1970b, 1975, 1980b). This data series provides civilian employment for industrial sectors, i.e., manufacturing, agriculture, finance, producer services, retail and personal services. For employment in the government sector, there is no single data set that could be relied upon. The state employment reviews for California (California Department, 1979; Center for Continuing, 1982), Oregon (Oregon Employment Division, 1965, 1970, 1975), and Washington (Washington State Employment, 1965, 1970, 1975) provide data for state and local government employment at the county level. The U.S. Department of Commerce City and County Data Book is a consistent source of data for federal government employment (U.S. Census, 1962c, 1976c, 1972c, 1977c).

The base of the relative employment opportunities variable is population. Two data sets provided the population data. The U.S. Census of Population and Housing provide population for 1960 and 1970 (U.S. Census, 1960, 1970a). The state data centers in California, Oregon, and California provide population estimates for the intercensal years.

The data to calculate unemployment comes from County Business Patterns (1965, 1970b, 1975, 1980b) and U.S. Vital Statistics (U.S. National Center for Health [U.S. Health], 1960, 1965, 1970, 1975) data for geographical areas. The unemployment variable is a measure of employment potential. The reported statistical rate of unemployment is not always representative of the degree of unemployment in nonmetropolitan counties. Government data series treat statistics for nonmetropolitan counties as residuals of metropolitan statistics (Briggs, 1981). The National Commission on Employment and Unemployment Statistics in 1979 found the incidence of job scarcity to be higher in nonmetropolitan counties, since the amount of underemployment (involuntarily part-time and discouraged workers) is greater in nonmetropolitan counties (Briggs, 1981). Blanco (1964) and Mazek and Chang (1972) concur from their studies the true unemployment is underreported.

Therefore, this study uses "prospective unemployment" as the measure of unemployment. Prospective unemployment is the difference between the natural rate of increase in the population minus the change in the working age population for the three study periods (i.e., 1960-1965, 1965-1970, and 1970-1975). The working age population is defined as the population over the age of 15 and less than the age of 65. According to Blanco (1964), the change in the working age population should be identical with the changes in

employment for the five-year interval. This study, therefore, has substituted changes in employment for the working age population, since the exact population figures are not available for the intercensal years. This does not correct all of the problems associated with measuring unemployment levels. At best this measurement is a proxy for unemployment given the problems at both the federal and state level to reliably measure the "real" unemployment rate.

Birth rate data comes from the U.S. National Center for Health Statistics Natality Series and death rates from the U.S. National Center for Health Statistics Mortality series (U.S. Health, 1960, 1965, 1970, 1975). The natural rate of increase is derived by taking the difference between the number of births and deaths in the five-year interval for each of the three periods studied to calculate a five-year growth rate. The employment figures comes from the U.S. Department of Commerce County Business Patterns (U.S. Census, 1965, 1970b, 1975, 1980b). For each period, a five-year growth rate is calculated. The employment potential rate is the difference between the five-year employment growth rate and the five-year growth rate of the natural increase in population.

Federal Statistics for Publicly and Privately Owned Utilities in the United States provide data for industrial utility rates (U.S. Energy, 1965, 1970, 1975). The utility

data, though, are reported by company specific rates. To derive county specific data required obtaining both the public and private utility companies service district maps to make the data specific to the county unit of analysis. When there is more than one utility district in a particular county, a weighted means average was calculated based on the population the district served.

The amenity variables for the labor in- and out-migration equations are calculated also from various data sources: U.S. Census of Population and Housing (U.S. Census, 1960, 1970a, 1980a), Federal Bureau of Investigations Crime Reports (U.S. Department of Justice, 1965, 1970, 1975) (as well as state crime reports), public education enrollment for universities and colleges (U.S. Department of Education, 1965, 1970, 1975), state comprehensive outdoor recreation plans (California Department, 1979; Center for Continuing, 1982; Oregon State Highway, 1967; Oregon State Parks, 1983; Washington State Interagency, 1983), and various state recreation agencies.

Housing data are acquired from the U.S. Bureau of Census and Population and Housing for the years 1960, 1970, and 1980 (U.S. Census, 1960, 1970a, 1980a). The median dollar value of a housing unit is not available at the county level for the intercensal years. Consequently, the value used in this study for the years 1965 and 1975 represents the midpoint for the 10-year interval.

The Federal Bureau of Investigations provides data for seven serious crimes, i.e. aggravated assault, burglary, forcible rapes, larceny/theft and motor vehicle theft, murder and manslaughter, and robbery (U.S. Department of Justice, 1965, 1970, 1975). The crime index reported is the number of serious crimes known to police per 100,000 population. The reporting of crime statistics to the U.S. Federal Bureau of Investigations, however, is not mandatory, the reporting is voluntary. As a consequence, it was necessary to supplement the federal data with state crime reports for California, Oregon, and Washington. The state reports contain information on all the counties in the individual states, but do not always report crime statistics annually. For the years when crime data are missing, an average is interpolated based on the interval immediately around the missing data.

The recreational opportunities index is based on calculating a composite factor score index for activity demand and availability of a recreational activity in a county. The data for availability are taken from an inventory of facilities provided in the state county outdoor recreation plans for the states of California (California Department, 1979; Center for Continuing, 1982), Oregon (Oregon State Highway, 1967; Oregon State Parks, 1983), and Washington (Washington State Interagency, 1983). Demand activity data are derived from statistics supplied by the

state Park and Recreation Departments on usage of campgrounds/picnic tables, hunting and game departments for hunting and fishing license data, and the Statistics for Pleasure Boats for the states of California and Oregon and Washington's Motor Vehicle Department for pleasure boat usage (Washington State Motor, 1975).

The age dependency ratio is calculated based on data collected from the U.S. Census of Population and Housing (U.S. Census, 1960, 1970a, 1998a) and from the population estimates made by the California (California State Census, 1965, 1975), Oregon (Center for Population, 1965, 1975), and Washington (Washington State Office, 1983; Washington State Data, 1965, 1975) state data centers. This required making some adjustments to the local populations estimates, because the state data centers' estimation techniques are inconsistent for age estimates in intercensal years. The age distribution data are obtained from the U.S. Census of Population and Housing for the years 1960, 1970, and 1980 (U.S. Census, 1960a, 1970a, 1980a). Therefore, for the years 1965 and 1975, the age distribution data are derived by using the midpoint of the 10-year differences interval. The breakdown of the age distribution then is proportioned according to the state data centers' county estimates for the intercensal years in 1965 and 1975.

The data for the income differences variable also had to be estimated for the intercensal years. The U.S. Census

of Population and Housing for 1960, 1970, and 1980 provide median income data for individual counties (U.S. Census, 1960, 1970a, 1980a). To obtain county median income for the intercensal years of 1965 and 1975, the midpoint of the 10-year interval is calculated. Since this study's focus is relative differences, median county income is compared to national median income. The relative income differences is the ratio of county median income divided by the median income of the United States. The larger the ratio, the greater the income difference is between the county and the rest of the United States.

CHAPTER SUMMARY AND CONCLUSIONS

The specified research model described in this chapter is used to investigate the role of economic and noneconomic factors during the nonmetropolitan turnaround. The noneconomic factors that are considered in the research model as environmental amenities are four-year college enrollment, recreational opportunities, education expenditures and income differences. The variables treated as environmental disamenities are adverse climate, age dependency, the proportion of population that is nonwhite, the crime rate and median housing price. The variables used to measure accessibility are the labor potential index, a contiguity variable (moves between adjacent counties), and population size. Employment variables are categorized as

basic or nonbasic employment opportunities. This categorization is based on whether a particular economic activity has above national average employment in a particular industrial sector.

The figure on the following page summarizes the basic relationships to be explored in the data analysis (see Table XVI).

TABLE XVI

THE EXPECTED RELATIONSHIP OF SPECIFIED VARIABLES WITH LABOR MIGRATION

	IN-MIGRATION	OUT-MIGRATION	EXPECTED MAGNITUDE
Nonadjacent Counties			
Amenity	+	-	Large
Disamenity	-	+	Small
Accessibility	+	+	Large
Basic Employment	+	-	Small
Nonbasic Employment	+	-	Small
Adjacent Counties			
Amenity	+	-	Large
Disamenity	-	+	Small
Accessibility	+	+	Large
Basic Employment	+	-	Small
Nonbasic Employment	+	-	Small
Metro < 500,000			
Amenity	+	-	Small
Disamenity	-	+	Small
Accessibility	+	+	Large
Basic Employment	+	-	Large
Nonbasic Employment	+	-	Large
Metro > 500,000			
Amenity	+	-	Small
Disamenity	-	+	Large
Accessibility	+	+	Large
Basic Employment	+	-	Large
Nonbasic Employment	+	-	Large

CHAPTER V

EMPIRICAL RESULTS OF MODEL CALIBRATIONS

This chapter presents the empirical results from the calibration of the labor migration models. The issues addressed in the chapter are (a) whether there are temporal differences between the pre-turnaround and turnaround models, (b) whether the differences found in the labor migration models are due to population size or proximity to large metropolitan counties, and (c) whether there are differences between labor in-migration and labor out-migration determinants.

The first section of this chapter describes briefly the model selection process for this study. This section discusses which estimation technique (i.e., ordinary least squares or simultaneous equations) is more appropriate for estimating labor migration equations.

The second section discusses the empirical findings of the labor migration equations. The focus of this discussion is on the temporal differences between the pre-turnaround and turnaround models. The research question is whether the observed changes in labor migration flows during the turnaround period represent a clean-break from the pre-turnaround period.

The third section summarizes whether the response of labor migrants to a county's areal characteristics (i.e., socio-environment amenities, economic activities, and accessibility) varies according to the county's size or proximity to larger metropolitan counties.

The fourth section of this chapter looks at whether or not labor migration to nonmetropolitan counties is a result of a spillover effect from the larger metropolitan counties into their surrounding exurban fringe (i.e., adjacent nonmetropolitan counties). This section attempts to address the argument presented in the recent literature on migration that the nonmetropolitan turnaround really is a function of an expanding urban field (i.e., an extension of metropolitan growth into its immediate hinterland).

MODEL SELECTION

A number of simultaneous estimation techniques are currently available to calibrate such relationships. Simultaneous estimation techniques treat individual relationships such as migration and employment as one broad system that contains several subcomponents. The two simultaneous estimation techniques attempted in this study are two stage least squares and three stage least squares.

This study finds the two stage least squares model more appropriate than the three stage least squares models

or the seemingly unrelated equations techniques in estimating labor migration models.

The two stage least squares estimation technique is quite easy to use and has been employed frequently in the scholarly work on population and labor migration in order to control for the causality problems found in modelling migration (Greenwood, 1975, 1981). In the first stage, the two stage least squares estimation technique creates an instrument variable for the endogenous variables (i.e., labor in-migration flows, labor out-migration flows, basic employment and non-basic employment). In the second stage, it replaces the endogenous variables with the estimated fitted variables. This makes it possible to obtain consistent estimators for the employment variables in the migration equations and the migration variables in the employment equations (Pindyck & Rubinfeld, 1981).

Three stage least squares, on the other hand, has an additional round of estimation (Pindyck & Rubinfeld, 1981). In the third stage of estimation, the results from the second stage estimation and the residual terms of the individual equations are entered into an additional round of estimation. The purpose of the third stage of estimation is to purge from the overall model any association between the separate equations (i.e., labor in-migration flows, labor out-migration flows, and employment growth equations).

Recent migration studies show the three stage least squares technique the more appropriate model (Greenwood, 1975, 1981). The contradictory results found in this study is not surprising given the difference in focus of this study with the other studies. Greenwood (1981) examined the structural relationship between migration, employment and income among all the 50 states in the United States which is a closed system. This study examined the response of labor migration flows to different characteristics of individual counties of the three Pacific states, which is not a closed system.

TESTING THE MIGRATION MODEL RESULTS FOR TEMPORAL CHANGE

The purpose of this study is to determine what factors are behind the turnaround of labor migration in the 1970s. The research question is whether this turnaround is a unique period or simply the accumulation of gradual economic and demographic restructuring. The first set of empirical tests discussed is a comparison of the model results for the three periods studied (1960-1965, 1965-1970, and 1970-1975). These periods are classified as pre-turnaround (1960-1965 and 1965-1970) and turnaround (1970-1975). As described previously, the data are aggregated into four spatially distinct regions: nonadjacent nonmetropolitan (those counties which are not physically adjacent to the large metropolitan counties), adjacent nonmetropolitan (those

counties which are physically adjacent to the large metropolitan counties), small metropolitan (those counties that are metropolitan with less than 500,000 residents) counties, and large metropolitan (those counties that are metropolitan with greater than 500,000 residents). In this study, the pre-turnaround model is used as a control model to gauge what are the general determinants of labor migration flows at a time when the major destination of labor migrants was metropolitan counties.

The unit of analysis for this study is the interaction of labor migration flows between origin and destination counties in the Pacific states of California, Oregon, and Washington. As mentioned in Chapter IV, nonemployment related moves between counties that are adjacent can be controlled if one eliminates moves of less than 100 miles (Wardwell & Gilchrist, 1980). For this study, a contiguity variable measures whether a move is from a county which is adjacent to the origin or destination county to see if moving less than 100 miles has a significant influence on labor mobility. If it does not, commuting between the old residence and a new employment location is not a significant issue.

The level of confidence for testing hypotheses in this dissertation is 95%. This confidence level is selected because of the possibility that the labor markets in the

Pacific states are not completely independent, because there may exist spatial autocorrelation in the model calibrations.

The functional form of the regression models are log linear, with the exception of the contiguity variable. The transformation of the variables into natural logarithm values creates a problem when the value is zero, because the logarithm of zero is undefined. For this study, a constant of 0.5 is added to values that are equal to zero (Fotheringham & O'Kelly, 1989; Sen & Soot, 1981).

To test whether the turnaround and pre-turnaround models are identical, a F test is used. The F test tests whether the coefficients of the different periods are equal. The F test not only examines whether the slope and parameters of the temporal models are distinct, but also tests the error structures of the models as well (Pindyck & Rubinfeld, 1981). All of the spatial models calibrated show the F tests for the turnaround and pre-turnaround models have critical values for the F distribution greater than the 5% level of significance. Consequently, it is incorrect to assume that the parameter coefficients are equal in the turnaround and pre-turnaround models (refer to Appendix C).

THE NONADJACENT MODELS

Tables XVII-XIX present the breakdown of empirical results for the nonadjacent nonmetropolitan counties. Several of the estimated parameters are opposite of original

expectations. The labor migration models explain a large proportion of the specified relationships; the R squares for the different periods range from 0.627 to 0.960.

Table XVII shows the empirical results of the labor migration model for the nonadjacent nonmetropolitan counties. The model results show how environmental amenities, environmental disamenities, accessibility, and employment influence labor migration flows to nonadjacent nonmetropolitan counties.

The influence of the environmental amenity variables on labor in-migration flows to nonadjacent counties is limited. In the 1960-1965 model, just two environmental amenities variables have a significant association with labor in-migration flows: recreational opportunities (a positive coefficient) and educational expenditures (a negative coefficient). There are no significant associations in the 1965-1970 model. In the 1970-1975 model, all of the environmental amenity variables, with the exception of per capita education expenditures, have a positive association with labor in-migration flows. However, only the variable for college enrollment has a significant association at the 95% confidence level. These results indicate that the amenity preferences for nonadjacent nonmetropolitan counties have not changed substantially since the 1960s.

TABLE XVII

NONADJACENT COUNTIES LABOR MIGRATION MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	0.207	0.089	5.466	5.550	3.935	3.492	3.372	6.945	9.190	1.686	4.571	4.427
EMPLOYMENT ACTIVITY VARIABLES												
BASIC EMPLOYMENT	-0.001	-0.097	-0.062	-5.088	-0.047	-4.409	0.011	1.340	-0.003	-0.109	-0.002	-0.147
NONBASIC EMPLOYMENT	-0.026	-1.137	-0.005	-0.980	0.001	0.170	-0.004	-0.230	-0.012	-0.273	0.004	0.189
ENVIRONMENTAL AMENITIES												
COLLEGE	0.002	0.836	0.001	1.016	-0.005	-0.791	0.001	0.952	0.004	1.250	0.006	1.960
EXPENDITURES	0.007	0.862	-0.006	-1.848	-0.001	-0.385	-0.007	-2.792	-0.001	-0.112	-0.002	-0.425
RECREATION	0.008	1.200	0.009	2.140	0.002	0.493	0.009	2.588	0.017	1.286	0.012	1.712
INCOME	0.477	-1.607	0.214	1.612	0.093	0.568	0.015	0.242	0.843	1.075	0.195	1.464
ENVIRONMENTAL DISAMENITIES												
AGE DEPENDENCY	-0.163	-2.118	-0.021	-0.396	-0.033	-0.816	-0.110	-3.061	0.107	0.575	0.065	0.662
UNEMPLOYMENT	0.002	0.820	0.001	1.345	-0.000	-0.067	-0.002	-2.037	0.001	0.225	-0.002	-0.835
NONWHITE	0.018	2.370	-0.003	-0.807	-0.001	-0.100	0.003	1.169	0.001	0.076	-0.001	-0.097
CRIME	0.027	0.726	0.025	4.688	0.040	9.417	0.014	2.552	0.037	1.007	0.026	1.354
CLIMATE	-0.054	-1.186	-0.087	-3.306	-0.043	-2.140	-0.008	-0.478	-0.052	-0.651	-0.025	-0.592
HOUSING	0.037	0.890	-0.028	-1.310	-0.021	-1.122	-0.074	-3.402	0.026	0.355	0.021	0.511
ACCESSIBILITY												
GRAVITY	0.036	10.333	0.092	10.164	0.073	7.169	0.039	7.371	0.025	2.525	0.040	11.588
CONTIGUOUS	2.336	0.790	0.900	1.521	0.200	0.359	-0.155	-0.479	5.336	1.570	2.592	1.442
POPULATION	-0.970	-24.021	-1.092	-53.792	-1.044	-55.470	-0.992	-84.723	-0.974	-21.103	-0.991	-43.174
F-VALUE	3,565.429		7,877.195		11,764.322		17,179.910		828.929		3,083.090	
PROB >	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.879		0.941		0.960		0.972		0.628		0.863	
ADJUSTED R	0.879		0.941		0.960		0.972		0.627		0.862	
EXPLAINED SUM SQUARES	10,351		1,0064		10,082		17,317		10,297		10,203	
ERROR SUM SQUARES	1,427		628		421		488		6103		1626	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm value, except for the contiguous variable.
2) The number of spatial interactions is 7,389 with 7,374 degrees of freedom (N-15).
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

TABLE XVIII

NONADJACENT BASIC EMPLOYMENT MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	3.828	42.758	1.967	14.139	2.906	22.117	2.591	23.256	2.390	39.911	2.532	40.908
EXOGENOUS VARIABLES												
LABOR MIGRATION FLOWS	0.055	3.589	0.478	23.670	0.237	11.837	-0.064	-4.641	0.178	18.734	0.187	19.979
NONBASIC EMPLOYMENT	0.624	14.560	-0.725	-60.169	-0.863	-73.494	0.535	8.465	0.532	15.270	0.528	15.678
INDEPENDENT VARIABLES												
AGRICULTURAL SERVICES	-0.162	-9.116	-0.137	-4.976	-0.136	-5.156	-0.036	-1.672	-0.021	-1.460	-0.055	-3.879
ROUTINE MANUFACTURING	-0.476	-14.427	-0.346	-7.074	-0.238	-5.076	-0.458	-15.398	-0.185	-9.319	-0.218	-9.993
PRODUCER	0.226	4.533	0.208	5.884	0.142	4.151	0.163	2.315	0.198	8.027	0.321	11.153
ENERGY	-0.401	-11.767	-0.068	-1.333	0.006	0.113	0.152	3.998	-0.194	-8.564	-0.238	-10.207
WAGES	1.205	14.564	-0.087	-0.922	-0.126	-1.397	0.713	7.356	0.554	12.077	0.557	10.626
FREEWAY	0.301	6.471	-0.208	-1.420	-0.917	-6.491	-0.181	-4.637	1.130	15.271	1.281	16.670
F VALUE	212.190		838.828		1,071.005		131.624		186.162		220.262	
PROB >	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.187		0.476		0.537		0.125		0.168		0.193	
ADJUSTED R	0.186		0.476		0.537		0.124		0.167		0.192	
EXPLAINED SUM SQUARES	2,356		19,288		22,736		1,387		932		1,152	
ERROR SUM SQUARES	10,248		21,215		19,586		9,728		4,615		4,824	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm value.
2) The number of spatial interactions is 7389 with 7381 degrees of freedom (N-8).
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

TABLE XIX

NONADJACENT NONBASIC EMPLOYMENT MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	-1.124	-9.113	2.536	8.083	5.042	18.711	-0.437	-4.756	-0.213	-2.154	1.200	9.026
ENDOGENOUS VARIABLES												
LABOR MIGRATION FLOWS	0.111	7.475	0.707	17.219	0.335	9.803	0.125	11.145	-0.015	-1.223	-0.010	-0.624
BASIC EMPLOYMENT	0.029	2.755	-1.149	-61.281	-1.041	-72.095	0.049	2.956	-0.059	-3.938	-0.101	-6.193
INDEPENDENT VARIABLES												
PERSONAL SERVICES/ RETAIL	-0.137	-1.142	1.090	5.537	0.010	0.058	-0.762	-6.559	0.213	3.566	-1.278	-10.028
GOVERNMENT	-0.099	-3.594	-0.164	-2.072	-0.344	-5.081	-0.085	-2.738	-0.251	-9.442	-0.386	-13.084
RETIREMENT	-0.193	-7.369	-0.232	-2.185	0.527	5.788	0.021	0.716	0.164	6.874	0.438	16.708
WAGES	-0.352	-3.422	-0.464	-2.572	0.210	1.363	0.582	5.703	-0.715	-12.886	0.494	4.445
F VALUE	224.119		756.336		1,170.291		56.739		152.757		128.917	
PROB > F	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.154		0.381		0.488		0.044		0.111		0.095	
ADJUSTED R	0.153		0.380		0.487		0.043		0.110		0.094	
EXPLAINED SUM SQUARES	731		19867		22496		210		392		388	
ERROR SUM SQUARES	4,014		32,323		23,653		4,572		3,158		3,706	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm value.
2) The number of spatial interactions is 7,389 with 7,383 degrees of freedom (N-6).
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

Table XVII shows that the environmental amenity variables have a minor influence on labor out-migration flows in the nonadjacent nonmetropolitan counties. The environmental amenities variables have no significant association with labor out-migration flows in the 1960-1965 and 1970-1975 models. In the 1965-1970 labor out-migration model results, the recreational opportunity variable has a significant and positive association with labor out-migration flows.

The influence of the environmental disamenity variables on labor in-migration flows to the nonadjacent nonmetropolitan counties is limited, if not spurious. In the 1965-1970 and 1970-1975, all of the environmental disamenity variables are insignificant. In the 1960-1965 model, however, the age dependency, unemployment and housing cost variables have the expected significant and negative association with labor in-migration flows. The crime rate variable, on the other hand, has an unexpected significant and positive association with labor in-migration flows in the 1960-1965 model.

Likewise, Table XVII shows that most of the environmental disamenity variables have an insignificant association with labor out-migration flows. However, the crime index variable in the 1965-1970 and 1970-1975 models has the expected significant and positive association with labor out-migration flows. The climate variable has a

significant and negative association with labor out-migration flows in the 1965-1970 model.

Accessibility as measured by the labor potential index, contiguity, and population size variables has a significant affect on labor migration flows to the nonadjacent nonmetropolitan counties. The labor potential index, which is calculated based on the interaction of the population of the origin and destination counties divided by the distance between the origin and destination counties, has a significant and positive association with labor migration flows. The contiguity variable has no significant influence on either labor migration flows. The population size variable has a significant and negative association with both labor in-migration and out-migration flows.

The employment activity variables in Table XVII do not have the expected influence on labor migration flows to the nonadjacent nonmetropolitan counties. Growth in basic employment is insignificantly associated with labor in-migration flows in all three periods. Yet the association between labor out-migration flows and growth in basic employment is as expected in the 1965-1970 and 1970-1975 models (significant and negative). In the 1960-1965 model, the association between labor out-migration and growth in basic employment is insignificant. The role that nonbasic employment growth plays in attracting labor

migration flows to nonadjacent counties is insignificant in both the labor in-migration and out-migration models.

In sum, Table XVII indicates that labor migration flows may be from the correct origins but not always toward the correct destination. These results are consistent with other research findings on interstate migration flows using the Continuous Work History File. Clark's (1983) study of labor migration flows between U.S. states found labor migration flows are from the correct origin states (i.e., states which are not growing), but not always to the correct destination states (states which are growing).

As mentioned previously, several researchers find that labor migration itself influences the basic employment growth (Greenwood, 1975, 1981). The following section focuses on how labor migration flows, economic activities in agricultural services, routine manufacturing and producer services, wage rates, and energy costs influence basic employment growth in nonadjacent nonmetropolitan counties.

Table XVIII shows how labor migration flows influence the growth of basic employment in the nonadjacent nonmetropolitan counties. Contrary to expectations, the 1965-1970 and 1970-1975 nonadjacent nonmetropolitan models show that both labor in-migration and out-migration flows have a positive and significant association with growth in basic employment. In the 1960-1965 model, the association between labor in-migration flows and growth in basic

employment is just the opposite (negative and significant), but the association between labor out-migration and growth in basic employment is significant and positive.

The scholarly literature suggests that there is a symbiotic relationship between growth in basic employment and nonbasic employment. Table XVIII indicates that this is the case in the nonadjacent counties. Nonbasic employment has a significant and positive influence on basic employment growth in the labor in-migration models. The nonadjacent labor out-migration model results show the opposite association between nonbasic employment growth and basic employment growth (refer to Table XVIII).

The results for the basic employment model support the hypothesis that some scholars have over emphasized manufacturing deconcentration (the spatial filtering of routine, less skilled manufacturing from statistical metropolitan areas to nonmetropolitan counties) as the primary determinant of the nonmetropolitan turnaround. The results for this study show that the employment opportunity variable for routine manufacturing during the turnaround period does not have a positive association with growth in basic employment. It should be noted here that the previous studies which found evidence of spatial filtering focused on geographical areas outside of the Pacific region, such as Erickson's (1976) study which examines spatial filtering in

the Great Lakes, and Park and Wheeler's (1983) study which examines spatial filtering in Georgia.

The influence of the other employment opportunity variables are more consistent with theoretical expectations. The employment opportunity variable for agricultural services has a significant and negative association with growth in basic employment in the 1970-1975 labor in-migration model. In the other two labor in-migration models (1960-1965 and 1965-1970), the association is insignificant. The association between the employment opportunity variable for agricultural services and growth in basic employment is negative and significant in the labor out-migration models (see Table XVIII).

Regional scholars indicate that service sector activities have had a major influence on growth in basic employment in nonmetropolitan counties during the turnaround period. The employment opportunity variable for producer services has the expected positive and significant relationship with growth in basic employment.

The production input variables in the nonadjacent nonmetropolitan model are inconsistent with the original expectations. The wage rate variable has a positive association with basic employment growth. This result contradicts the least-cost hypothesis for wages which postulates that growth in employment in nonmetropolitan counties is negatively associated with wage rates.

Industrial energy prices, on the other hand, have the expected significant and negative association with growth in basic employment in the labor in-migration model results (except in the 1960-1965 model). The effect of the energy price variable in the labor out-migration model, however, is minimal.

Access influences growth in basic employment in nonadjacent nonmetropolitan counties. The presence of the interstate highway system (freeway) in a county is used as a measure of access in this dissertation. The freeway variable has a significant and positive association with growth in the 1965-1970 and 1970-1975 labor in-migration models. In the 1960-1965 model, at a time just prior to the completion of the Interstate 5 freeway system in California, Oregon, and Washington, the association was significant and negative. The association between growth of basic employment and the freeway variable in the labor out-migration model is negative and significant in all three models (refer to Table XVIII).

Some researchers hypothesize that the influence of labor migration on nonbasic employment growth should be different from its influence on basic employment growth. Table XIX shows the model results for the growth in nonbasic employment in the nonadjacent nonmetropolitan counties. The nonbasic employment model shows some unexpected results. For instance, basic employment growth has an unexpected

negative association with growth in the nonbasic sectors in the 1965-1970 and 1970-1975 labor in-migration and out-migration models. In the 1960-1965 model, however, the association is positive and significant as expected, while the association is negative and significant in the labor out-migration model.

The labor migration flow variable has not had a major influence on growth in nonbasic employment in the nonadjacent nonmetropolitan counties. On the other hand, the labor out-migration flow variable has the expected negative and significant association with growth in nonbasic employment in the 1965-1970 and 1970-1975 labor out-migration models.

The employment opportunity variables have a significant association with nonbasic employment growth. The employment opportunity variable for personal services and retail has a significant and negative association with nonbasic employment growth in the 1960-1965 and 1970-1975 model calibrations. In the 1965-1970 labor in-migration and out-migration model, the association is positive and significant. The government variable has a negative and significant association with growth in nonbasic employment opportunities in both the labor in-migration and labor out-migration models. What is unexpected is the similarity of association between nonbasic growth and the employment

opportunity variables in the labor out-migration and labor in-migration models.

The results in Table XIX show evidence for the hypothesis that nonmetropolitan nonbasic employment growth in the early 1970s is related to the influx of retired persons. The presence of population over 65 has a significant association with growth in nonbasic employment in the 1965-1970 and 1970-1975 labor in-migration models, whereas the association between population over 65 and growth in nonbasic employment is insignificant in the 1960-1965 labor in-migration model.

The wage rate variable has a significant influence on growth in nonbasic employment in the nonadjacent nonmetropolitan counties in the labor in-migration model. The wage rate variable has a positive association with growth in nonbasic employment in the 1960-1965 and the 1970-1975 model. In the 1970-1975 labor out-migration model, the association is insignificant. The 1965-1970 labor out-migration and labor in-migration model calibrations show that the wage rate variable has the opposite association with growth in nonbasic employment (negative and significant).

THE ADJACENT NONMETROPOLITAN COUNTIES

Tables XX-XXII show the empirical results for the adjacent nonmetropolitan counties. Like the nonadjacent

models, several of the parameters in the labor in-migration and out-migration equations are asymmetrical. The models explain a great deal of the specified relationships. The R squares range from 0.781 to 0.953.

Table XX displays the results of the labor migration model calibrations for the adjacent nonmetropolitan counties.

The environmental amenity variables have a minor if not spurious influence on the adjacent nonmetropolitan labor migration flows. In the 1970-1975 labor in-migration model, no environmental amenity variable is significant. In the 1965-1970 labor in-migration model, the income differential variable has a significant and negative association with labor in-migration flows. In the 1960-1965 labor in-migration model, the recreational opportunity variable has a significant and positive association with labor in-migration flows and the educational expenditure variable has a significant and negative association with labor in-migration flows.

The influence of the environmental amenity variables on labor out-migration flows in the adjacent nonmetropolitan county models is not significant. None of the environment amenity variables has a significant influence on labor out-migration flows.

TABLE XX

ADJACENT COUNTIES LABOR MIGRATION MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	3.123	2.045	2.337	1.261	1.752	0.830	2.430	3.348	-1.574	-0.796	2.275	3.076
EMPLOYMENT ACTIVITY VARIABLES												
BASIC EMPLOYMENT	-0.006	-0.905	-0.003	-0.077	-0.047	-1.583	0.026	1.922	0.003	0.158	0.010	0.837
NONBASIC EMPLOYMENT	-0.052	-3.753	-0.030	-1.697	-0.033	-2.010	-0.048	-1.714	-0.008	-0.140	0.026	0.575
ENVIRONMENTAL AMENITIES												
COLLEGE	0.002	0.498	-0.003	-0.641	0.006	0.564	0.001	0.494	-0.001	-0.112	0.003	0.443
EXPENDITURES	-0.008	-1.297	-0.012	-1.521	-0.008	-1.115	-0.013	-3.237	-0.008	-0.602	0.005	0.524
RECREATION	-0.000	-0.001	0.007	1.115	0.003	0.416	0.018	3.346	0.002	0.241	0.012	1.794
INCOME	-0.029	-0.133	0.016	0.065	-0.171	-0.580	-0.033	-0.341	-0.666	-2.599	0.085	1.156
ENVIRONMENTAL DISAMENITIES												
AGE DEPENDENCY	-0.080	-0.981	-0.160	-1.517	-0.192	-3.427	-0.109	-2.149	-0.089	-0.488	-0.073	-0.541
UNEMPLOYMENT	-0.001	-0.346	-0.002	-0.728	-0.002	-0.846	-0.000	-0.178	-0.006	-1.327	-0.004	-1.137
NONWHITE	-0.016	-1.974	0.012	0.991	0.010	0.870	0.005	1.321	0.005	0.205	0.025	1.367
CRIME	-0.001	-0.102	0.027	2.850	0.025	3.059	0.012	1.422	-0.007	-0.340	0.013	0.956
CLIMATE	-0.023	-0.967	0.012	0.378	-0.017	-0.576	0.004	0.119	-0.005	-0.193	0.073	1.697
HOUSING	0.005	0.147	-0.014	-0.349	-0.070	-2.176	-0.064	-2.004	-0.025	-0.362	-0.055	-1.069
ACCESSIBILITY												
GRAVITY	0.047	7.158	0.043	1.035	0.052	1.707	0.087	5.314	0.073	5.673	0.077	6.863
CONTIGUOUS	-0.294	-0.414	-0.964	-0.860	-1.059	-1.096	-0.744	-1.304	-2.318	-1.790	-1.639	-1.482
POPULATION	-1.008	-76.943	-0.917	-9.891	-0.978	-13.666	-1.028	-51.999	-1.016	-24.281	-0.976	-36.347
F-VALUE	3077.705		1822.601		2069.167		7364.278		645.400		1293.007	
PROB >	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.895		0.835		0.852		0.954		0.721		0.782	
ADJUSTED R	0.895		0.835		0.852		0.953		0.720		0.782	
EXPLAINED SUM SQUARES	4157		4466		4508		12709		3109		4512	
ERROR SUM SQUARES	486		1822		783		620		1205		1255	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm value, except for contiguous variable.
2) The number of spatial interactions is 5407 with 5397 degrees of freedom (N-15).
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

TABLE XXI

ADJACENT COUNTIES BASIC EMPLOYMENT MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	2.576	12.187	1.511	3.805	1.544	4.550	2.620	20.323	0.674	2.030	1.789	6.290
EXOGENOUS VARIABLES												
LABOR MIGRATION FLOWS	-0.190	-7.783	0.113	2.387	0.001	0.026	-0.063	-3.951	-0.184	-4.815	-0.168	-5.498
NONBASIC EMPLOYMENT	0.275	7.317	-0.780	-60.168	-0.815	-65.199	0.565	7.733	-0.780	-10.667	-0.611	-9.358
INDEPENDENT VARIABLES												
AGRICULTURAL SERVICES	-0.333	-14.431	-0.128	-4.955	-0.113	-4.294	-0.033	-1.317	-0.610	-15.012	-0.583	-16.661
ROUTINE MANUFACTURING	-0.292	-11.433	-0.209	-6.145	-0.232	-6.513	-0.460	-13.163	-0.037	-1.037	-0.031	-1.016
PRODUCER	0.299	6.038	0.075	1.032	-0.042	-0.475	0.160	1.949	0.468	4.932	0.556	6.787
ENERGY	0.911	17.045	-0.249	-3.731	-0.019	-0.288	0.141	3.183	0.849	12.378	1.030	16.753
WAGES	1.128	18.163	-0.168	-1.882	0.087	1.053	0.723	6.365	0.245	2.778	0.458	6.215
FREEWAY	0.510	12.696	0.257	4.545	0.216	2.352	-0.171	-3.801	0.406	4.559	0.474	6.447
F VALUE	363.837		760.535		808.475		92.216		90.551		147.887	
PROB >	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.350		0.530		0.545		0.125		0.162		0.180	
ADJUSTED R	0.349		0.529		0.544		0.124		0.160		0.179	
EXPLAINED SUM SQUARES	3,718		13,060		14,090		1,019		5,824		1,793	
ERROR SUM SQUARES	6,897		11,589		11,761		7,152		5,204		8,183	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm value.
2) The number of spatial interactions is 5,407 with 5,399 degrees of freedom (N-8).
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

TABLE XXII

ADJACENT NONBASIC EMPLOYMENT MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	-1.272	-9.458	2.301	7.024	2.710	8.570	-0.459	-4.258	-0.093	-0.711	0.339	3.072
ENDOGENOUS VARIABLES												
LABOR MIGRATION FLOWS	0.169	10.599	0.148	3.587	0.057	1.480	0.123	9.260	0.034	2.081	-0.006	-0.466
BASIC EMPLOYMENT	0.115	10.110	-1.140	-60.308	-1.122	-65.523	0.056	2.892	0.034	2.337	0.094	7.688
INDEPENDENT VARIABLES												
PERSONAL SERVICES/RETAIL	-1.181	-6.738	-0.236	-1.174	-0.009	-0.044	-0.715	-5.242	0.153	1.562	0.227	2.714
GOVERNMENT	-0.703	-18.351	-0.321	-3.439	-0.145	-1.596	-0.086	-2.380	-0.494	-12.712	-0.331	-10.146
RETIREMENT	-0.601	-14.261	-0.007	-0.075	0.037	0.409	0.017	0.495	-0.187	-4.823	-0.124	-3.809
WAGES	0.990	6.782	0.693	3.776	0.602	3.349	0.537	4.477	0.134	1.533	0.164	2.193
F VALUE	126.930		1015.905		1149.350		41.904		72.928		148.330	
PROB > F	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.124		0.530		0.561		0.045		0.104		0.142	
ADJUSTED R	0.123		0.530		0.560		0.043		0.103		0.140	
EXPLAINED SUM SQUARES	385		18682		20813		154		162		337	
ERROR SUM SQUARES	2731		16553		15808		3326		72		2045	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm value.
2) The number of spatial interactions is 5407 with 5401 degrees of freedom (N-6).
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

The environmental disamenity variables have a limited influence on the adjacent nonmetropolitan labor migration flows. In the 1970-1975 model, three of the environmental disamenity variables show the expected negative association with labor in-migration flows (age dependency, unemployment, and average housing prices). Two of the environmental disamenity variables (age dependency and climate) have a significant influence on labor in-migration flows in the 1960-1965 labor in-migration model (refer to Table XX). Table XVI shows that the influence of the environmental disamenity variables on labor out-migration flows to the adjacent nonmetropolitan counties is limited. The crime rate variable has a significant and positive association with labor out-migration flows in the 1965-1970 and 1970-1975 models. The proportion of nonwhite population has an unexpected positive and significant association with labor out-migration.

Accessibility (as measured by the labor potential index, contiguity, and population size variables) is a major factor in explaining labor migration flows to adjacent nonmetropolitan counties. The labor potential index has a significant association with both labor in-migration and labor out-migration flows. Population size has a significant, negative association with labor migration flows. The effect of movement between contiguity counties has a significant negative effect on labor in-migration

flows in the 1960-1965 and 1965-1970 model calibrations. In the 1970-1975 model calibrations, the association between the contiguity county variable and labor in-migration flows is insignificant. The association between the contiguity variables and labor out-migration flows is insignificant.

The economic activity variables have an insignificant influence on labor migration flows to the adjacent nonmetropolitan counties. Just in the 1960-1965 labor out-migration model is the association between the employment growth variables and labor out-migration significant.

Table XXI displays the results for calibrating the basic employment model which examines the influence of labor migration flows, growth in nonbasic employment, employment opportunities in agricultural services, routine manufacturing, producer services, industrial energy rates, and wage rates on growth in basic employment in the adjacent nonmetropolitan counties.

The influence of labor migration flows on basic employment growth in adjacent nonmetropolitan counties is not as expected. The 1960-1965 basic employment model shows the labor in-migration flow variable has no significant influence on basic employment growth. Whereas, in the 1965-1970 and 1970-1975 model calibrations, the association between the labor in-migration flow variable and growth in basic employment is significant and negative. The

association between the labor out-migration flow variable and growth in basic employment is the opposite, positive and significant in all three model calibrations (refer to Table XXI).

The influence of growth in nonbasic employment on growth in basic employment is not always as expected. In the 1960-1965 and 1970-1975 basic employment model, growth in nonbasic employment, has had a significant and positive association with growth in basic employment in the labor in-migration model. Yet in the 1965-1970 labor in-migration model, growth in nonbasic employment has a negative and significant association with growth in basic employment.

The results for the labor out-migration model are more consistent with the expected outcomes, growth in nonbasic employment has a significant and negative association with growth in basic employment in the 1965-1970 and 1970-1975 out-migration model. However, in the 1960-1965 labor out-migration model, the association is the opposite.

Table XXI shows several unexpected associations between growth in basic employment and the employment opportunity variables. The association between the employment opportunity variable for agricultural services and growth in basic employment is negative and significant in most of the labor migration models. The employment opportunity variable for routine manufacturing has a negative association with growth in basic employment in the

1970-1975 and 1960-1965 labor in-migration models and a positive association with growth in basic employment in the 1965-1970 labor in-migration model.

The relationship between the employment opportunity variables and basic employment growth in Table XXI is as expected in the labor out-migration calibrations. In the labor out-migration models, the employment opportunity variables for routine manufacturing and agricultural services have a significant and negative association with growth in basic employment in all three model calibrations.

The hypothesis that not enough attention has been paid to the role services play in adjacent nonmetropolitan counties is supported in the model results. The association between the employment opportunity variable for producer services and growth in basic employment is positive and significant. However, the association between the producer service variable and growth in basic employment in the labor out-migration model is spurious in Table XXI.

The parameter results for the cost variables as measured by energy prices and wage rates is not consistent with original expectations in the adjacent nonmetropolitan counties over time. The energy price variable shows a positive and significant association with growth in basic employment in both the labor in-migration and labor out-migration models. The wage rate variable, as well, has a significant and positive influence on growth in basic

employment in the adjacent nonmetropolitan counties in the labor in-migration models. The labor out-migration model results also show an inconsistent relationship between the cost variables and growth in basic employment.

The model results for the adjacent nonmetropolitan counties make it difficult to determine whether the nonmetropolitan growth in basic employment in the early 1970s in the Pacific states is a result of a de-industrialization process which led to a filtering of traditional basic economic activity (i.e., routine manufacturing and agriculture) from nearby metropolitan regions to their adjacent nonmetropolitan fringe.

Table XXII displays the results of the calibration for the adjacent nonmetropolitan nonbasic employment model.

The association between labor migration flows and growth in nonbasic employment in the adjacent nonmetropolitan counties is consistent with theoretical expectations. The labor in-migration flow variable has a positive and significant association with growth in nonbasic employment. The labor out-migration variable has a limited association with growth in nonbasic employment.

The association between growth in basic employment and nonbasic employment is as expected in the adjacent county model. Growth in basic employment has a positive and significant association with nonbasic employment growth in the labor in-migration models. In the labor out-migration

models, the association is negative and significant, except in the 1960-1965 model.

There are several unexpected associations between the employment opportunity variables and nonbasic employment growth in the smaller metropolitan county model results. In most of the labor in-migration models, the employment opportunity variables have a negative and significant association with nonbasic employment growth. In the labor out-migration models, the personal services and the retail trade variable has an insignificant association with nonbasic employment growth (refer to Table XXII).

The other variables in the nonbasic employment model show contradictory results in the smaller metropolitan county model results. The wage rate variable shows an unexpected positive and significant association with growth in nonbasic employment, except in the 1965-1970 model. Contrary to expectations, the retirement variable has a negative and significant association with nonbasic employment in both the labor out-migration and labor in-migration models except in the 1960-1965 labor in-migration model.

SMALLER METROPOLITAN COUNTY MODEL RESULTS

The following section analyzes the empirical results of the smaller metropolitan county models (those counties that are metropolitan, but have a population less than

500,000). Tables XXIII-XXV display the empirical results for the smaller metropolitan county calibrations. The smaller metropolitan labor migration models explain a medium to large proportion of the specified relationship. The R squares range from 0.351 to 0.840.

Table XXIII displays the results of the calibration of the smaller metropolitan labor migration flow models.

The environmental amenity variables do not have a major influence on labor in-migration flows to the smaller metropolitan counties. Just one of the environmental amenities variables, the recreational opportunities, has a positive and significant affect on labor migration in the 1970-1975 model. None of the environmental variables have a significant association with labor out-migration.

Only a few of the environmental disamenities variables have the expected negative association with labor in-migration flows in the smaller metropolitan counties. The crime rate variable has the expected significant and negative association with labor in-migration, whereas age dependency, climate, and the housing variables have an unexpected significant and positive association with labor in-migration flows in the 1970-1975 model. In the 1965-1970 model, just the climate variable has a significant association with labor in-migration (the coefficient is positive). In the 1960-1965 model, the age dependency and climate variables have the expected negative and significant

TABLE XXIII

METRO < 500,000 COUNTIES LABOR MIGRATION MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	-0.477	-0.054	-1.190	-0.163	7.986	0.667	4.561	1.939	0.070	0.020	-2.859	-0.820
EMPLOYMENT VARIABLES												
BASIC EMPLOYMENT	0.151	0.390	-0.104	-1.323	-0.102	-0.943	0.019	0.726	0.089	0.159	0.002	0.004
NONBASIC EMPLOYMENT	-0.023	-0.225	0.013	0.498	0.005	0.109	-0.266	-4.322	-0.030	-0.208	0.007	0.056
ENVIRONMENTAL AMENITIES												
COLLEGE	0.022	1.144	0.005	1.156	0.002	0.127	0.008	1.681	0.021	0.738	0.013	0.541
EXPENDITURES	-0.001	-0.041	0.005	0.206	-0.027	-0.731	-0.025	-2.925	-0.013	-0.537	-0.014	-0.687
RECREATION	0.020	0.712	-0.003	-0.122	-0.014	-0.541	0.038	3.168	0.025	0.962	0.035	1.545
INCOME	0.418	0.288	-0.213	-0.201	1.223	0.695	0.183	0.580	0.657	0.859	0.186	0.670
ENVIRONMENTAL DISAMENITIES												
AGE DEPENDENCY	0.241	0.309	0.270	0.904	0.265	0.610	-0.325	-2.585	0.294	0.426	0.771	1.303
UNEMPLOYMENT	0.012	0.647	0.000	0.001	-0.002	-0.229	-0.001	-0.313	0.011	0.378	0.011	0.425
NONWHITE	0.105	0.784	0.052	1.056	0.122	1.454	0.017	0.709	0.151	1.169	0.124	1.121
CRIME	0.008	0.168	0.028	0.684	-0.065	-0.978	0.017	0.691	-0.009	-0.170	-0.027	-0.591
CLIMATE	0.495	1.422	0.135	1.113	0.230	1.220	-0.172	-3.495	0.498	1.280	0.525	1.561
HOUSING	0.153	0.442	0.110	1.122	0.055	0.377	-0.010	-0.137	0.221	0.551	0.390	1.133
ACCESSIBILITY												
GRAVITY	0.190	1.501	0.232	3.880	0.277	3.318	0.073	1.890	0.230	2.454	0.244	2.863
CONTIGUOUS	-2.712	-0.340	2.284	1.218	-2.549	-0.744	0.958	1.085	-4.059	-0.690	-3.063	-0.606
POPULATION	-1.022	-16.969	-1.154	-9.216	-1.218	-6.592	-0.968	-15.813	-1.022	-14.249	-1.066	-17.386
F-VALUE	169.006		343.616		152.297		1214.745		104.523		151.291	
PROB >	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.533		0.699		0.507		0.891		0.413		0.505	
ADJUSTED R	0.530		0.697		0.503		0.891		0.409		0.502	
EXPLAINED SUM SQUARES	1591		1676		1598		4299.374		1589		1691	
ERROR SUM SQUARES	1395		723		1556		524.763		2256		1659	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm value, except for contiguous variable.
2) The number of spatial interactions is 2239 with 2224 degrees of freedom (N-15).
3) Level of statistical significance is 95% or $|t| \geq 1.96$ amenities.

TABLE XXIV

METRO < 500,000 BASIC EMPLOYMENT MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	3.739	63.303	3.765	5.604	5.883	11.075	2.829	13.763	1.931	35.499	2.182	20.304
ENDOGENOUS VARIABLES												
LABOR MIGRATION FLOWS	0.102	12.179	0.627	6.654	0.557	7.052	-0.062	-2.114	0.096	13.990	0.082	1.138
NONBASIC EMPLOYMENT	0.021	1.621	-0.509	-19.720	-0.590	-29.669	0.645	6.361	-0.027	-2.332	-0.026	16.299
INDEPENDENT VARIABLES												
AGRICULTURAL SERVICES	0.215	20.450	0.175	2.392	0.220	3.501	-0.040	-0.966	0.311	30.631	0.311	5.928
ROUTINE MANUFACTURING	0.691	19.183	1.320	7.600	1.510	10.490	-0.510	-9.274	1.021	28.504	0.997	-0.814
NONROUTINE MANUFACTURING	-0.091	-9.317	-0.201	-3.441	-0.234	-4.667	0.274	1.993	-0.132	-17.854	-0.133	2.859
PRODUCER	1.017	29.820	1.205	6.625	1.414	8.963	0.135	1.058	1.100	38.686	1.083	6.062
ENERGY	0.434	17.515	0.788	5.085	0.928	7.213	0.132	1.858	0.558	24.341	0.550	5.241
WAGES	-2.090	-27.266	-3.358	-8.764	-3.724	-11.356	0.823	4.747	-2.578	-36.246	-2.525	-4.232
FREEWAY	-0.276	-28.821	-0.121	-1.586	-0.140	-2.184	-0.102	-1.520	-0.319	-36.147	-0.308	-18.055
F VALUE	551.154		181.433		297.131		36.427		734.482		741.782	
PROB >	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.690		0.423		0.545		0.128		0.748		0.749	
ADJUSTED R	0.689		0.420		0.544		0.125		0.747		0.748	
EXPLAINED SUM SQUARES	162		3789		4421		456.142		176		175	
ERROR SUM SQUARES	73		5175		3686		3102.715		59		58	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm value.
2) The number of spatial interactions is 2239 with 2230 degrees of freedom (N-9).
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

TABLE XXV

METRO < 500,000 NONBASIC EMPLOYMENT MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	-3.746	-19.889	5.569	2.287	7.188	4.488	-0.850	-5.158	-0.253	-1.545	-0.176	-1.090
ENDOGENOUS VARIABLES												
LABOR MIGRATION FLOWS	0.090	2.881	1.501	3.040	1.007	3.298	0.049	2.497	0.107	3.662	0.062	2.325
BASIC EMPLOYMENT	1.331	38.151	-1.935	-12.252	-1.616	-20.239	0.102	3.664	1.332	38.411	1.333	38.641
INDEPENDENT VARIABLES												
PERSONAL SERVICES/RETAIL	-1.293	-3.902	-0.758	-0.321	-0.315	-0.182	0.377	3.629	-1.533	-4.469	-1.578	-4.461
GOVERNMENT	0.145	3.711	-0.150	-0.516	-0.061	-0.291	-0.181	-3.371	0.118	2.930	0.118	2.836
RETIREMENT	0.032	0.443	-1.719	-2.314	-1.271	-2.574	0.000	0.005	0.019	0.272	0.117	1.769
WAGES	1.266	3.637	1.683	0.632	1.149	0.593	-0.432	-4.464	1.533	4.287	1.508	4.096
F VALUE	292.701		147.437		296.248		18.691		293.670		294.296	
PROB > F	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.440		0.284		0.443		0.048		0.441		0.441	
ADJUSTED R	0.439		0.282		0.442		0.045		0.439		0.440	
EXPLAINED SUM SQUARES	426		8169		8341		66.407		427		426	
ERROR SUM SQUARES	542		20621		296		1322.258		542		294	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm values.

2) Number of spatial interactions 2239 with 2233 degrees of freedom (N-6).

3) Level of statistical significance is 95% or $|t| \geq 1.96$.

association with labor in-migration. The environmental disamenity variables have a limited influence on labor out-migration. In the 1970-1975 model, both the variables for percentage of the population nonwhite and climate have the expected significant and positive association with labor out-migration flows. In the 1965-1970 model, the variable for percentage nonwhite has the expected significant and positive association with labor out-migration. In the 1960-1965 model, none of the environmental disamenity variables has a significant association with labor out-migration flows.

The accessibility variables have a major influence on labor migration to the smaller metropolitan counties. The labor potential index has a significant association with labor migration. The effect of a county being contiguous is insignificant. The association between population size and labor migration flows is negative and significant.

Basic employment does not have a significant influence on labor migration flows in the smaller metropolitan county models. Nor does nonbasic employment growth have a significant influence on labor migration flows.

Table XXIV displays the results of the model calibration for growth in basic employment in the smaller metropolitan counties.

The labor in-migration flow variable does not have a significant influence on basic employment growth in the

smaller metropolitan counties, except in the 1965-1970 model. However, the labor out-migration flow variable has an unexpected positive and significant influence on growth in basic employment.

In the smaller metropolitan counties, there is a symbiotic relationship between nonbasic employment growth and basic employment growth. In the labor in-migration models, nonbasic employment growth has a positive and significant influence on basic employment growth (except in the 1965-1970 model). In the labor out-migration models, the association is negative and significant as expected (except in the 1965-1970 model).

Several of the employment opportunity variables have a significant influence in the labor in-migration basic employment models. As expected, the employment opportunity variables for nonroutine manufacturing and producer services have a positive and significant association with basic employment growth (but the association is negative in the 1965-1970 model). The employment opportunity variable for routine manufacturing shows an insignificant association with growth in basic employment in the 1970-1975 model, and a negative and significant association with basic employment growth in the 1965-1970 labor in-migration model. What is unexpected is the significant and negative association between the variable for employment opportunities in routine

manufacturing with growth in basic employment in the 1960-1965 model.

The traditional least cost variables have a significant influence on basic employment growth in the smaller metropolitan county models. The wage rate variable has a negative and significant association with basic employment growth in the labor in-migration models (except in the 1960-1965 model). The energy cost variable has an unexpected positive association with growth in basic employment.

Table XXV shows the results of the nonbasic employment model calibrations for the smaller metropolitan counties. The results are not always consistent with expectations. There is an unexpected similarity between the labor in-migration and out-migration models. Both the coefficients for labor in-migration and labor out-migration flows have a significant and positive association with the nonbasic employment variable.

The association between basic employment and nonbasic employment is as expected in the smaller metropolitan county models. In the 1960-1965 and 1970-1975 labor in-migration models, the association between basic employment growth and nonbasic employment growth is significant and positive. In the labor out-migration models, the association between basic employment and nonbasic employment is negative as expected, except in the 1960-1965 model.

There are several unexpected associations between the employment opportunity variables and nonbasic employment growth. In the 1970-1975 labor in-migration model, the personal services and retail trade variable has a negative and significant association with nonbasic employment growth. The government services variable, on the other hand, has a significant and positive association with nonbasic employment growth in the 1970-1975 labor in-migration model. In the 1965-1970 labor in-migration model, there is no significant association between the employment opportunity variables and nonbasic employment growth. In the 1960-1965 labor in-migration model, the personal services and retail trade variable, on the other hand, has a significant and positive association with nonbasic employment growth.

The coefficients for the employment opportunity variables are not always as originally expected in the labor out-migration model. In the labor out-migration model, the employment opportunity variable for personal services and retail trade have an insignificant association with nonbasic employment growth (except in the 1960-1965 model), whereas the government services variable has a significant and positive association with nonbasic employment growth.

The influence of the wage rate variable on nonbasic employment in the smaller metropolitan counties is spurious in the model results. The wage rate variable has a positive and significant association with nonbasic employment growth

in the 1970-1975 labor in-migration model. Yet in the 1965-1970 labor in-migration model, the association is insignificant. In the 1960-1965 labor in-migration model, the association is significant and negative as expected. In the labor out-migration models, the wage rate variable has just a limited influence on nonbasic employment growth (refer to Table XXV).

The variable for population over 65 has only a minor influence on growth in nonbasic employment in the smaller metropolitan counties. The variable is insignificant (except in the 1970-1975 labor out-migration model).

THE LARGER METROPOLITAN COUNTIES

Tables XXVI-XXVII display the results for the large metropolitan county model calibrations. The following section analyzes the empirical results of the equations for the larger metropolitan county models. The calibrations for the larger metropolitan models explain a small to medium proportion of the specified relationship; the R squares for the labor migration model range from 0.289 to 0.657.

Table XXVI displays the results of the model calibrations for the labor migration flows to the large metropolitan counties.

TABLE XXVI

METRO > 500,000 COUNTIES LABOR MIGRATION MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	-33.015	-4.423	-20.187	-1.867	-4.731	-0.341	0.045	0.007	1.984	0.346	1.466	0.671
EMPLOYMENT ACTIVITY VARIABLES												
BASIC EMPLOYMENT	-0.046	-1.100	-0.118	-0.728	-0.478	-3.061	0.090	0.956	-0.295	-2.499	-0.218	-3.702
NONBASIC EMPLOYMENT	-0.014	-0.341	-0.034	-1.050	-0.056	-1.459	0.171	0.618	0.138	1.446	0.149	2.854
ENVIRONMENTAL AMENITIES												
COLLEGE	-0.026	-2.020	-0.022	-1.852	-0.016	-0.926	0.019	1.254	0.001	0.066	0.013	0.958
EXPENDITURES	0.025	0.964	-0.050	-1.859	-0.059	-1.775	0.019	0.541	0.105	1.650	0.052	1.578
RECREATION	0.130	2.855	0.185	3.958	0.190	3.356	0.033	0.761	-0.099	-1.323	-0.042	-1.079
INCOME	-4.779	-4.688	-2.695	-1.998	-0.883	-0.474	0.271	0.309	0.315	0.428	0.062	0.359
ENVIRONMENTAL DISAMENITIES												
AGE DEPENDENCY	-1.180	-4.318	-0.840	-1.769	0.191	0.504	-0.387	-0.943	-1.965	-3.015	-1.640	-4.763
UNEMPLOYMENT	-0.008	-1.509	-0.005	-0.815	0.006	0.904	-0.005	-0.365	-0.029	-1.653	-0.027	-3.136
NONWHITE	0.119	2.732	0.053	0.947	-0.006	-0.129	0.010	0.304	-0.068	-0.731	-0.039	-0.796
CRIME	0.015	0.375	0.004	0.120	-0.089	-2.317	0.091	1.265	0.236	2.794	0.189	4.525
CLIMATE	-0.172	-1.472	0.026	0.195	-0.030	-0.193	0.236	1.059	-0.125	-0.446	-0.232	-1.643
HOUSING	-0.341	-1.748	-0.074	-0.382	0.058	0.259	-0.346	-1.249	-0.711	-1.452	-0.823	-3.246
ACCESSIBILITY												
GRAVITY	0.252	6.690	0.276	2.625	0.563	4.669	0.119	1.916	0.141	1.716	0.268	5.075
CONTIGUOUS	1.908	0.913	4.742	2.176	3.478	1.301	12.106	4.056	10.019	2.246	3.851	1.375
POPULATION	-0.902	-17.893	-1.033	-3.085	-1.800	-5.654	-0.890	-6.224	-0.812	-7.444	-1.040	-15.302
F-VALUE	316.210		196.831		128.458		68.085		62.630		262.299	
PROB >	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.659		0.546		0.439		0.293		0.276		0.615	
ADJUSTED R	0.657		0.543		0.436		0.289		0.272		0.613	
EXPLAINED SUM SQUARES	2117		2380		2130		3431		2308		2552	
ERROR SUM SQUARES	1097		1983		2719		8261		6046		1596	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm values.
2) Number of cases is 2479 with 2474 degrees of freedom (N-15).
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

TABLE XXVII

METRO > 500,000 COUNTIES BASIC EMPLOYMENT MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	5.960	24.402	5.996	4.263	9.113	6.640	2.484	12.987	3.404	22.200	3.703	24.873
EXOGENOUS VARIABLES												
LABOR MIGRATION FLOWS	0.356	12.967	0.917	5.334	1.084	5.973	-0.079	-2.894	0.300	16.548	0.314	17.731
NONBASIC EMPLOYMENT	0.312	13.525	-0.209	-3.645	-0.211	-3.652	0.491	4.630	0.305	18.021	0.289	16.731
INDEPENDENT VARIABLES												
AGRICULTURAL SERVICES	0.285	6.488	0.281	2.327	0.226	2.035	-0.056	-1.428	0.160	5.130	0.104	3.210
ROUTINE MANUFACTURING	-0.477	-7.147	0.249	1.556	0.228	1.586	-0.462	-8.874	0.029	0.548	-0.126	-2.340
NONROUTINE MANUFACTURING	0.369	21.127	0.001	0.016	0.025	0.638	-0.046	-0.340	0.255	19.294	0.320	21.828
PRODUCER	1.423	24.266	0.052	0.357	0.132	1.027	0.148	1.224	1.024	21.311	1.229	24.097
ENERGY	0.571	9.928	0.110	0.779	0.179	1.374	0.172	2.616	0.245	5.413	0.305	6.631
WAGES	-2.021	-19.185	-0.763	-3.002	-0.901	-3.952	0.768	4.692	-1.878	-21.929	-2.055	-23.253
FREEWAY	-0.043	-1.157	-0.202	-1.867	-0.134	-1.319	-0.167	-2.768	0.105	3.953	0.087	3.154
F VALUE	272.923		160.776		222.981		41.543		255.683		280.287	
PROB >	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.499		0.370		0.449		0.132		0.483		0.506	
ADJUSTED R	0.497		0.368		0.447		0.129		0.481		0.504	
EXPLAINED SUM SQUARES	1589		526		6001		489		53		1009	
ERROR SUM SQUARES	1594		1888		7371		3223		1491		987	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm values.

2) Number of spatial interactions is 2479 with 2470 degrees of freedom (N-9).

3) Level of statistical significance is 95% or $|t| \geq 1.96$.

TABLE XXVIII

METRO > 500,000 NONBASIC EMPLOYMENT MODEL

	OUT-MIGRATION FLOW MODEL						IN-MIGRATION FLOW MODEL					
	1960-1965		1965-1970		1970-1975		1960-1965		1965-1970		1970-1975	
	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:	BETA	T for Ho:
CONSTANT	-4.590	-16.632	-11.574	-11.572	-10.131	-10.157	-0.517	-2.833	-2.318	-8.721	-1.653	-6.259
ENDOGENOUS VARIABLES												
LABOR MIGRATION FLOWS	-0.332	-15.274	-1.307	-9.091	-1.495	-11.685	0.107	4.268	-0.227	-11.444	-0.202	-10.540
BASIC EMPLOYMENT	0.282	16.425	-0.684	-7.389	-0.600	-8.228	0.061	2.168	0.425	17.184	0.413	17.615
INDEPENDENT VARIABLES												
PERSONAL SERVICES/RETAIL	1.586	7.998	4.506	10.214	4.273	10.651	-0.411	-2.093	0.906	4.498	0.953	4.705
GOVERNMENT	-1.097	-11.484	-1.413	-6.753	-1.491	-7.797	-0.129	-2.443	-0.714	-7.252	-0.770	-7.882
RETIREMENT	0.128	1.330	0.302	1.361	0.295	1.470	0.036	0.742	0.087	0.913	0.056	0.591
WAGES	-1.120	-5.915	-3.511	-8.159	-3.235	-8.293	0.237	1.381	-0.538	-2.798	-0.586	-3.024
F VALUE	114.711		501.189		629.685		14.537		110.442		108.170	
PROB > F	0.000		0.000		0.000		0.000		0.000		0.000	
R SQUARE	0.218		0.549		0.605		0.034		0.212		0.208	
ADJUSTED R	0.216		0.548		0.604		0.032		0.210		0.206	
EXPLAINED SUM SQUARES	526		11014		11507		53		494		484	
ERROR SUM SQUARES	1888		9040		7517		1491		1841		1842	

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm values.
2) Number of spatial interactions is 2479 with 2473 degrees of freedom (N-6).
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

The influence of the environmental amenity variables on labor migration flows to larger metropolitan counties is minimal. None of environmental amenity variables has a significant association with labor in-migration. In the labor out-migration models, the environmental amenity variables have a limited influence on labor out-migration flows as well. The recreational opportunities variable has a significant, but unexpected association with labor out-migration flows. In the 1960-1965 model, just the income differentials variable has the expected negative and significant association with labor out-migration flows.

Several of the environmental disamenity variables have a significant influence on labor in-migration flows to large metropolitan areas. In the 1970-1975 model, the age dependency, unemployment, and housing price variables have a negative and significant association with labor in-migration flows. In the 1965-1970 model, the age dependency variable has the expected negative and significant influence on labor in-migration, whereas the crime rate has the unexpected significant and positive influence on labor in-migration flows. In the 1960-1965 model, the age dependency variable has the significant and negative influence on labor in-migration flows.

Environmental disamenities have a limited influence on labor out-migration flows to the larger metropolitan areas. Just two of the environmental disamenity variables have a

significant association with labor out-migration flows. In the 1960-1965 model, the age dependency variable has an unexpected significant and negative influence on labor out-migration flows, whereas percentage nonwhite has the expected significant and positive influence on labor out-migration flows.

Accessibility has a significant influence on labor migration flows to the larger metropolitan areas. In most of the model results, the labor potential index has a positive and significant association with labor migration flows. Moves from contiguous counties have a positive influence on labor migration flows to the large metropolitan areas (except in the 1965-1970 labor out-migration model). Population size has a negative influence on labor migration flows to the large metropolitan areas (see Table XXVI).

Basic employment growth has a negative association with labor in-migration flows in the large metropolitan model results, except in the 1960-1965 model. Conversely, basic employment growth has a negative and significant association with labor out-migration flows in the 1970-1975 model results.

Nonbasic employment growth has a limited influence on labor migration flows to the large metropolitan areas. In most of the models, nonbasic employment growth has an insignificant influence on labor migration flows.

Table XXVII shows that in most of the large metropolitan models, the influence of labor migration flows on growth in basic employment is significant and positive. What is not expected is the positive and significant association between labor out-migration and growth in basic employment.

The effect of the shift of economic activities in the large metropolitan areas from routine manufacturing to other industrial sectors is seen in Table XXVII. The variable for routine manufacturing shows a negative and significant association with growth in basic employment in the labor in-migration models (except for the 1965-1970 model), whereas the variable for nonroutine manufacturing has a significant and positive influence on basic employment growth in the labor in-migration models. In the labor out-migration models, the association between the nonroutine manufacturing variable and basic employment growth is insignificant (except in the 1960-1965 model).

The hypothesis that producer services have a significant influence on growth in basic employment in the large metropolitan areas is supported by the model calibrations. The variable for producer services has a significant and positive association with growth in basic employment in the labor in-migration models (except in the 1960-1965 model).

A surprising result of the large metropolitan model calibrations is the significant association between the employment opportunity variable for agricultural services and growth in basic employment. The employment opportunity variable for agricultural services has a positive and significant association with growth in basic employment.

The empirical results for the large metropolitan counties are more consistent with the classical location theory than the results found in the nonmetropolitan models. The variable for wage rates has a significant and negative association with growth in basic employment in most of the labor in-migration models as expected. However, the variable for energy rates has a positive and significant association with growth in basic employment.

Access is a major influence on growth of basic employment in the large metropolitan areas. The freeway variable has a significant and positive association with basic employment, except in the 1960-1965 labor in-migration model.

Table XXVIII displays the results of the calibration on the nonbasic employment models for the large metropolitan areas.

The association between labor migration flows and growth in nonbasic employment is not as expected. The labor in-migration flow variable has an unexpected negative and significant association with growth in nonbasic employment

(except in the 1960-1965 model). In the labor out-migration models, the labor migration flow variable has the expected significant and negative association with employment.

The growth in basic employment has the expected significant and positive influence on growth in nonbasic employment in the labor in-migration models. In the labor out-migration models, growth in basic employment has a significant and negative association with growth in nonbasic employment.

The employment opportunity variables have a significant influence on growth in nonbasic employment, but not always as expected. The employment opportunity variable for personal services and retail trade has a significant and positive influence on growth in nonbasic employment in the labor in-migration models. Whereas, the government service variable has a significant and negative association with growth in nonbasic employment.

The association between growth in nonbasic employment and the wage rate variable is significant and negative as expected (except for the 1960-1965). What is not expected is the lack of symmetry between the labor in-migration and out-migration model results.

The influence of retirement is not significant in the large metropolitan area models (see Table XXVII).

TESTING THE PUSH AND PULL MODELS FOR SPATIAL DIFFERENCES

The factors behind the nonmetropolitan turnaround and economic deconcentration vary spatially according to population size and proximity to metropolitan regions. The F tests used to compare whether the beta coefficients are equal for the adjacent and nonadjacent models show that one cannot assume the beta coefficients are equal for the nonmetropolitan models. Nor can one assume the beta coefficients are equal for the large and small metropolitan models (refer to the Appendix C).

A COMPARISON OF SPATIAL MODEL RESULTS

The following section summarizes the similarities and differences found in the nonmetropolitan and metropolitan county model results for the turnaround period (the 1970-1975 model results). The results of the F tests used to test whether the coefficients of the nonmetropolitan and metropolitan models are equal show that the nonadjacent and adjacent nonmetropolitan models are significantly different and the small and large metropolitan models are significantly different as well. Several of the estimated parameters have opposite signs in the metropolitan and nonmetropolitan model calibrations. However, the differences found between the two nonmetropolitan county model results are much greater than the differences found

for the two metropolitan county model results (see Tables XXIX-XXX).

Tables XXIX and XXX compare the 1970-1975 labor migration flow model results for different county types studied. Table XXIX shows the results for the two nonmetropolitan county types studied (the nonadjacent and nonadjacent county models). Table XXX shows the results for the two metropolitan county types studies (the smaller metropolitan county with populations less than 500,000 and the large metropolitan areas with populations greater than 500,000).

The influence of environmental amenities and disamenities is limited, if not spurious in most of the model calibrations. The environmental amenity variables are more important in the nonadjacent nonmetropolitan model results. In particular, college enrollment has a significant and positive influence on labor in-migration to the nonadjacent counties.

The environmental disamenity variables, on the other hand, have a greater influence on labor migration to the larger metropolitan counties than they do on labor migration to the nonadjacent, adjacent and smaller metropolitan counties. Most of the environmental disamenity variables have a negative association with labor in-migration (with the exception of the crime index variable in the larger metropolitan county models). The crime rate variable has

TABLE XXIX

NONMETROPOLITAN COUNTIES LABOR MIGRATION MODEL, 1970-1975

	OUT-MIGRATION FLOW MODELS					IN-MIGRATION FLOW MODELS				
	NONADJACENT COUNTIES		ADJACENT COUNTIES			NONADJACENT COUNTIES		ADJACENT COUNTIES		
	BETA	T for Ho:	BETA	T for Ho:	EXPECTED	BETA	T for Ho:	BETA	T for Ho:	EXPECTED
CONSTANT	3.935	3.492	0.830	1.709		4.571	4.427	2.276	3.076	
EMPLOYMENT VARIABLES										
BASIC	-0.047	-4.409	-1.583	-1.713	-	-0.002	-0.147	0.010	0.837	+
NONBASIC	0.001	0.170	-2.010	-1.458	-	0.004	0.189	0.026	0.575	+
ENVIRONMENTAL AMENITIES										
COLLEGE	-0.005	-0.791	0.564	0.883	-	0.006	1.960	0.003	0.443	+
EXPENDITURES	-0.001	-0.385	-1.115	-1.203	-	-0.002	-0.425	0.005	0.524	+
RECREATION	0.002	0.493	0.416	-0.978	-	0.012	1.712	0.012	1.794	+
INCOME	0.093	0.568	-0.580	0.359	-	0.195	1.464	0.085	1.156	+
ENVIRONMENTAL DISAMENITY										
AGE DEPENDENCY	-0.033	-0.816	-3.427	-3.077	+	0.065	0.662	-0.073	-0.541	-
UNEMPLOYMENT	-0.000	-0.067	-0.846	-1.150	+	-0.002	-0.835	-0.004	-1.137	-
NONWHITE	-0.001	-0.100	0.870	1.066	+	-0.001	-0.097	0.025	1.367	-
CRIME	0.040	9.417	3.059	6.436	+	0.026	1.354	0.013	0.956	-
CLIMATE	-0.043	-2.140	-0.576	-0.723	+	-0.025	-0.592	0.073	1.697	-
HOUSING	-0.021	-1.122	-2.176	-3.343	+	0.021	0.511	-0.055	-1.069	-
ACCESSIBILITY										
GRAVITY	0.073	7.169	1.707	2.716	+	0.040	11.588	0.077	6.863	+
CONTIGUOUS	0.200	0.359	-1.096	0.063		2.592	1.442	-1.639	-1.482	
POPULATION	-1.044	-55.470	-13.666	-21.840	-	-0.991	-43.174	-0.976	-36.347	-
F-VALUE	11764.322		3713.749			3083.090		1293.007		
PROB >	0.000		0.000			0.000		0.000		
R SQUARE	0.960		0.912			0.863		0.782		
ADJUSTED R	0.960		0.912			0.862		0.782		

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm values.
2) Number of nonadjacent interactions is 7389 and adjacent interactions is 5407 with N-15 degrees of freedom.
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

TABLE XXX

METROPOLITAN COUNTIES LABOR MIGRATION MODEL, 1970-1975

	OUT-MIGRATION FLOW MODELS					IN-MIGRATION FLOW MODELS				
	METRO < 500,000		METRO > 500,000			METRO < 500,000		METRO > 500,000		
	BETA	T for Ho:	BETA	T for Ho:	EXPECTED	BETA	T for Ho:	BETA	T for Ho:	EXPECTED
CONSTANT	7.986	0.667	-13.545	-1.142		-2.859	-0.820	1.466	0.671	
EMPLOYMENT ACTIVITY VARIABLES										
BASIC EMPLOYMENT	-0.102	-0.943	-0.342	-2.513	-	0.002	0.004	-0.218	-3.702	+
NONBASIC EMPLOYMENT	0.005	0.109	-0.060	-1.841	-	0.007	0.056	0.149	2.854	+
ENVIRONMENTAL AMENITIES										
COLLEGE	0.002	0.127	0.011	0.648	-	0.013	0.541	0.013	0.958	+
EXPENDITURES	-0.027	-0.731	-0.046	-1.638	-	-0.014	-0.687	0.052	1.578	+
RECREATION	-0.014	-0.541	0.158	3.261	-	0.035	1.545	-0.042	-1.079	+
INCOME	1.223	0.695	-1.804	-1.129	-	0.186	0.670	0.062	0.359	+
ENVIRONMENTAL DISAMENITIES										
AGE DEPENDENCY	0.265	0.610	0.001	0.004	+	0.771	1.303	-1.640	-4.763	-
UNEMPLOYMENT	-0.002	-0.229	0.004	0.699	+	0.011	0.425	-0.027	-3.136	-
NONWHITE	0.122	1.454	-0.008	-0.208	+	0.124	1.121	-0.039	-0.796	-
CRIME	-0.065	-0.978	-0.018	-0.530	+	-0.027	-0.591	0.189	4.525	-
CLIMATE	0.230	1.220	0.028	0.211	+	0.525	1.561	-0.232	-1.643	-
HOUSING	0.055	0.377	0.107	0.565	+	0.390	1.133	-0.823	-3.246	-
ACCESSIBILITY										
GRAVITY	0.277	3.318	0.478	4.686	+	0.244	2.863	0.268	5.075	+
CONTIGUOUS	-2.549	-0.744	2.488	1.222		-3.063	-0.606	3.851	1.375	
POPULATION	-1.218	-6.592	-1.480	-5.631	-	-1.066	-17.386	-1.040	-15.302	-
F-VALUE	152.297		177.679			151.291		262.299		
PROB >	0.000		0.000			0.000		0.000		
R SQUARE	0.507		0.520			0.505		0.615		
ADJUSTED R	0.503		0.517			0.502		0.613		

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm values.
2) Number of small metropolitan cases is 2479 and 2239 with 15 degrees of freedom.
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

the expected negative and significant association in the smaller metropolitan labor in-migration model.

Accessibility has a significant influence on labor migration flows. The labor potential index has a positive and significant association with labor migration in all the model results. The effect of movement between contiguous counties has a significant and positive influence on labor in-migration to the large metropolitan counties, but an insignificant influence in the other spatial model results. This may be a result of commuting from the exurban fringe to the larger metropolitan counties. Population size is inversely related to labor in-migration in all the spatial models tested.

Tables XXXI and XXXII display the differences found in the nonmetropolitan and metropolitan basic employment models. The basic employment model results are not consistent with some of the scholarly work on industrialization in the United States, which postulates that the turnaround is a result of the spatial division of labor (Bluestone & Harrison, 1982; Clark, 1981; Cohen & Zysman, 1987). The spatial division of labor hypothesis postulates that nonmetropolitan growth is the consequence of a spatial filtering of routine manufacturing employment from metropolitan counties to the peripheral nonmetropolitan counties in the 1970s. According to the spatial division of labor hypothesis, employment growth in nonmetropolitan

TABLE XXXI

NONMETROPOLITAN BASIC EMPLOYMENT MODEL, 1970-1975

	OUT-MIGRATION FLOW MODELS					IN-MIGRATION FLOW MODELS				
	NONADJACENT COUNTIES		ADJACENT COUNTIES			NONADJACENT COUNTIES		ADJACENT COUNTIES		
	BETA	T for Ho:	BETA	T for Ho:	EXPECTED	BETA	T for Ho:	BETA	T for Ho:	EXPECTED
CONSTANT	2.906	22.117	4.550	6.661		2.532	40.908	1.789	6.290	
ENDOGENOUS VARIABLES										
LABOR MIGRATION FLOWS	0.237	11.837	0.026	1.600	-	0.187	19.979	-0.168	-5.498	+
NONBASIC EMPLOYMENT	-0.863	-73.494	-65.199	-64.339	-	0.528	15.678	-0.611	-9.358	+
INDEPENDENT VARIABLES										
AGRICULTURAL SERVICES	-0.136	-5.156	-4.294	-4.508	+	-0.055	-3.879	-0.583	-16.661	-
ROUTINE MANUFACTURING	-0.238	-5.076	-6.513	-6.536	-	-0.218	-9.993	-0.031	-1.016	+
PRODUCER	0.142	4.151	-0.475	-0.958	-	0.321	11.153	0.556	6.787	+
ENERGY	0.006	0.113	-0.288	-0.449	+	-0.238	-10.207	1.030	16.753	-
WAGES	-0.126	-1.397	1.053	1.565	+	0.557	10.626	0.458	6.215	-
FREEWAY	-0.917	-6.491	2.352	3.605	+	1.281	16.670	0.474	6.447	-
F VALUE	1071.005		780.373			220.262		147.887		
PROB >	0.000		0.000			0.000		0.000		
R SQUARE	0.537		0.536			0.193		0.180		
ADJUSTED R	0.537		0.536			0.192		0.179		

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm values.
2) Number of nonadjacent interactions is 7389 and adjacent interactions is 5407 with N-8 degrees of freedom.
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

TABLE XXXII

METROPOLITAN BASIC EMPLOYMENT MODEL

	OUT-MIGRATION FLOW MODEL					IN-MIGRATION FLOW MODEL				
	METRO < 500,000		METRO > 500,000			METRO < 500,000		METRO > 500,000		
	BETA	T for Ho:	BETA	T for Ho:	EXPECTED	BETA	T for Ho:	BETA	T for Ho:	EXPECTED
CONSTANT	5.883	11.075	7.833	5.954		2.182	20.304	3.703	24.873	
ENDOGENOUS VARIABLES										
LABOR MIGRATION FLOWS	0.557	7.052	0.917	5.257	-	0.082	1.138	0.314	17.731	+
NONBASIC EMPLOYMENT	-0.590	-29.669	-0.262	-4.702	-	-0.026	16.299	0.289	16.731	+
INDEPENDENT VARIABLES										
AGRICULTURAL SERVICES	0.220	3.501	0.322	2.966	+	0.311	5.928	0.104	3.210	-
ROUTINE MANUFACTURING	1.510	10.490	0.329	2.409	+	0.997	-0.814	-0.126	-2.340	-
NONROUTINE MANUFACTURING	-0.234	-4.667	-0.028	-0.803	-	-0.133	2.859	0.320	21.828	+
PRODUCER	1.414	8.963	0.101	0.805	-	1.083	6.062	1.229	24.097	+
ENERGY	0.928	7.213	0.133	1.058	-	0.550	5.241	0.305	6.631	-
WAGES	-3.724	-11.356	-0.878	-3.954	-	-2.525	-4.232	-2.055	-23.253	-
FREEWAY	-0.140	-2.184	-0.199	-2.011	-	-0.308	-18.055	0.087	3.154	+
F VALUE	297.131		237.786			741.782		280.287		
PROB >	0.000		0.000			0.000		0.000		
R SQUARE	0.545		0.465			0.749		0.506		
ADJUSTED R	0.544		0.463			0.748		0.504		

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm values.
2) Number of small metropolitan interactions is 2239 and large metropolitan interactions is 2479 with N-8 degrees of freedom.
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

counties should be negatively associated with wage rates. The model results for this study show this is not the case for the nonmetropolitan counties in the three Pacific states.

This study finds that nonmetropolitan counties also underwent a de-industrialization process. Consequently, the variable for employment opportunity in producer services has a significant and positive association with growth in basic employment. Moreover, the variable for routine manufacturing has a negative association with growth in basic employment in the nonmetropolitan county models.

Basic employment growth in the metropolitan counties is no longer dependent on growth in routine manufacturing. The metropolitan counties in the Pacific states are experiencing a post-industrial restructuring to a high technology and service-oriented economy. Basic employment growth shows a significant association with the employment opportunity variables for nonroutine manufacturing and producer services.

The economic cost variables show different associations in the metropolitan and nonmetropolitan model results. The wage rate variables have a negative influence on basic employment growth in the metropolitan county models, while in the nonmetropolitan county model results they have a positive influence. Energy costs, however, show no significant association with growth in basic employment.

Access as measured by the interstate freeway system remains a significant factor in growth of basic employment activities in both the nonmetropolitan and metropolitan counties.

The relatively low R squares in both the nonmetropolitan and metropolitan basic employment growth models indicate that other factors mentioned in the turnaround literature but which are not addressed in this dissertation may play a greater role in stimulating growth in basic employment in nonmetropolitan counties, i.e., an nonlocal corporate decision makers, availability of a skilled labor pool, and cheap land (Kale & Lonsdale, 1979).

Tables XXXIII and XXXIV show the differences found between the nonmetropolitan and metropolitan nonbasic employment models. Growth in nonbasic employment in the larger metropolitan counties (but not the smaller metropolitan counties) is associated with central place activities (i.e., retail trade and personal services). What is unexpected is that the variable for employment opportunity in government services has a negative and significant association with growth in nonbasic employment. The retirement variable has no significant effect on growth in nonbasic employment in the metropolitan county models.

TABLE XXXIII

NONMETROPOLITAN NONBASIC EMPLOYMENT MODEL

	OUT-MIGRATION FLOW MODEL					IN-MIGRATION FLOW MODEL				
	NONADJACENT COUNTIES		ADJACENT COUNTIES			NONADJACENT COUNTIES		ADJACENT COUNTIES		
	BETA	T for Ho:	BETA	T for Ho:	EXPECTED	T for Ho:	T for Ho:	T for Ho:	T for Ho:	EXPECTED
CONSTANT	5.042	18.711	8.570	5.870		1.200	9.026	0.339	3.072	
ENDOGENOUS VARIABLES										
LABOR MIGRATION FLOWS	0.335	9.803	1.480	2.490	-	-0.001	-0.624	-0.006	-0.466	+
BASIC EMPLOYMENT	-1.041	-72.095	-65.523	-65.477	-	-0.100	-6.193	0.094	7.688	+
INDEPENDENT VARIABLES										
PERSONAL SERVICE/RETAIL	0.010	0.058	-0.044	0.525	-	-1.270	-10.028	0.227	2.714	+
GOVERNMENT	-0.344	-5.081	-1.596	-2.553	-	-0.380	-13.084	-0.331	-10.146	+
RETIREMENT	0.527	5.788	0.409	-3.982	-	-0.437	16.708	-0.124	-3.809	+
WAGES	0.210	1.363	3.349	2.670	+	0.493	4.445	0.164	2.193	-
F VALUE	1170.291		1149.300			128.917		148.330		
PROB > F	0.000		0.000			0.000		0.000		
R SQUARE	0.488		0.561			0.095		0.142		
ADJUSTED R	0.487		0.560			0.094		0.140		

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm values.
2) Number of nonadjacent interactions is 7389 and adjacent interactions is 5407 with N-6 degrees of freedom.
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

TABLE XXXIV

METROPOLITAN NONBASIC EMPLOYMENT MODEL

	OUT-MIGRATION FLOW MODEL					IN-MIGRATION FLOW MODEL				
	METRO COUNTIES < 500,000		METRO COUNTIES > 500,000			METRO < 500,000		METRO > 500,000		
	BETA	T for Ho:	BETA	T for Ho:	EXPECTED	BETA	T for Ho:	BETA	T for Ho:	EXPECTED
CONSTANT	7.188	4.488	-9.893	-9.978		-0.176	-1.090	-1.653	-6.259	
ENDOGENOUS VARIABLES										
LABOR MIGRATION FLOWS	1.007	3.298	-1.460	-11.499	-	0.062	2.325	-0.202	-10.540	+
BASIC EMPLOYMENT	-1.616	-20.239	-0.627	-8.621	-	1.333	38.641	0.413	17.615	+
INDEPENDENT VARIABLES										
PERSONAL SERVICES/RETAIL	-0.315	-0.182	4.314	10.739	-	-1.578	-4.461	0.953	4.705	+
GOVERNMENT	-0.061	-0.291	-1.485	-7.767	-	0.118	2.836	-0.770	-7.882	+
RETIREMENT	-1.271	-2.574	0.279	1.388	-	0.117	1.769	0.056	0.591	+
WAGES	1.149	0.593	-3.284	-8.405	-	1.508	4.096	-0.586	-3.024	-
F VALUE	296.248		632.721			294.296		108.170		
PROB > F	0.000		0.000			0.000		0.000		
R SQUARE	0.443		0.606			0.441		0.208		
ADJUSTED R	0.442		0.605			0.440		0.206		

Notes: 1) Both dependent and independent variables have been transformed into natural logarithm values.
2) Number of small metropolitan interactions is 2239 and large metropolitan interactions is 2479 with N-6 degrees of freedom.
3) Level of statistical significance is 95% or $|t| \geq 1.96$.

In the nonadjacent nonmetropolitan counties, growth in nonbasic employment is not due to increased employment opportunities. The retirement variable has a significant and positive association with growth in nonbasic employment. While in the adjacent nonmetropolitan county models, the retirement variable has a significant and negative association with growth in nonbasic employment.

The influence of the wage rate variable on growth of nonbasic employment is a function of population size. In the larger metropolitan county models, there is a negative relationship between wages and growth in nonbasic employment. In the other county models, there is a positive association between wage rates and growth in nonbasic employment.

THE METROPOLITAN DIFFUSION MODEL

To test whether or not the movement to nonmetropolitan counties is a function of a spillover effect from the larger metropolitan counties to the exurban nonmetropolitan counties, all labor flows between metropolitan and their adjacent nonmetropolitan counties are excluded from the database.

Information is not available to determine whether these migrants commuted from the fringe to the metropolitan counties for work. However, the significance of the contiguous variable (movement between adjacent counties) in

the large metropolitan counties is an indication of the possibility that employment moves from adjacent counties to the large metropolitan counties is a result of exurban commuting. The results of the F test for the controlled adjacent model versus the uncontrolled model show statistically the coefficients are not equal. However, the differences in the parameter values vary slightly. For instance, the coefficient for basic employment increased from 0.006 to 0.011; the coefficient for nonbasic employment decreased from 0.023 to 0.015. The coefficient for basic employment in the labor out-migration model controlling for proximity to metropolitan counties shows a decrease of -0.059 to -0.061, and the nonbasic coefficient shows an increase from 0.002 to 0.006.

Likewise, the effect of excluding labor flows between the large metropolitan counties and the adjacent nonmetropolitan counties show the beta coefficients are not equal. Again the parameter estimates show just slight differences (refer to Appendix B).

Table XXXV shows the movement between the spatial regions studied during the turnaround period. The significance of employment relocation in the Pacific states from metropolitan to nonmetropolitan counties appears to be somewhat overstated. A breakdown of labor migration by county type for the turnaround period reveals several things. First, the number one destination of labor migrants

in the Pacific states continued to be the large metropolitan counties during the turnaround. Although more labor migrants left metropolitan counties than moved to them during the turnaround, the large metropolitan counties were the destination for 70.95% of all labor migrants. The metropolitan regions with less than 500,000 residents received 14.03% of the labor migrants. The adjacent counties received 8.23% of the labor migrants and and the nonadjacent counties received 6.79% of the labor migrants.

TABLE XXXV

LABOR MIGRATION FLOW MATRIX BY ORIGIN AND DESTINATION COUNTY TYPES FOR THE STATES OF CALIFORNIA, OREGON, AND WASHINGTON, 1970-1975

	COUNTY TYPE MIGRANT MOVED TO (DESTINATION COUNTY)				(ROW AND % TOTALS REPRESENT ORIGIN TOTALS)
COUNTY TYPE MIGRANT MOVED FROM (ORIGIN COUNTY)	LARGE METROPOLITAN > 500,000	SMALL METROPOLITAN < 500,000	ADJACENT NONMETRO-POLITAN	NON-ADJACENT NONMETRO POLITAN	
LARGE METROPOLITAN AREAS (POPULATION > 500,000)	5478 (76.91)* (80.86)*	913 (12.82) (68.13)	436 (6.12) (55.47)	296 (4.16) (45.68)	7123 74.59
SMALL METROPOLITAN COUNTIES (POPULATION < 500,000)	748 (62.59) (11.04)	189 (15.82) (14.10)	149 (12.47) (18.96)	109 (9.12) (16.82)	1195 12.50
ADJACENT NONMETROPOLITAN	288 (45.79) (4.25)	142 (22.58) (10.60)	83 (13.20) (10.56)	116 (18.44) (17.90)	629 6.50
NONADJACENT NONMETROPOLITAN	261 (43.36) (3.85)	96 (15.95) (7.16)	118 (19.60) (15.01)	127 (21.10) (19.60)	602 6.30
(COLUMN AND PERCENT TOTALS REPRESENT DESTINATION TOTALS)	6775 70.95	1340 14.03	786 8.23	648 6.79	9549 100.00

*Notes: 1) First row of numbers in parenthesis indicates percentage of the row total (origin).
2) Second row of numbers in parenthesis indicates percentage of column total (destination).
Source: U.S. Economic (1976a).

Most of the labor migrants from large metropolitan counties moved laterally to other large metropolitan areas (approximately 76.91%). Just 10% of the large metropolitan labor out-migrants moved to nonmetropolitan counties (see Table XXXV). Most of the labor migrants from the smaller metropolitan counties moved to the large metropolitan counties (approximately 62.5%). Twenty-one percent of the labor migrants from the smaller metropolitan counties moved to nonmetropolitan counties. Approximately 46% of the labor migrants from adjacent counties moved to the larger metropolitan counties. Forty percent of the adjacent county migrants moved to other nonmetropolitan counties. Approximately 31% of the adjacent nonmetropolitan labor migrants moved to other nonmetropolitan counties. Almost 43% of the nonadjacent nonmetropolitan migrants moved to the larger metropolitan counties. Slightly over 40% of the nonadjacent labor migrants moved to other nonmetropolitan counties (see Table XXXV).

SYMMETRY TESTS FOR IN- AND OUT-MIGRATION MODELS

Because of the unexpected symmetry found in calibrating the migration models, the model results need to be checked for symmetry. To formally test whether or not the unexpected associations between labor in-migration, labor out-migration and the employment variables are statistically significant, a restricted model is tested by

substituting the estimated parameters for basic employment, nonbasic employment and the migration variables in the labor out-migration with the estimated parameters from the labor in-migration model and vice versa.

The question of concern is whether the association occurs because areas that are destinations for migrants, as well as origins for migrants, are simply migration prone or whether the unexpected results are due to the rational assumptions behind migration modelling.

A reexamination of the migration literature indicates that the similarity in signs of the coefficients for labor in-migration and labor out-migration model results are not uncommon. Mueser (1987) indicates this unexpected association is frequently postulated as a result of a compositional effect: "areas that attract large numbers of migrant arrivals grow to have populations that are more migration prone, thus increasing the probability that an individual will depart" (p. 3). Mueser points out that the empirical tests of the compositional effects are not successful.

For this dissertation, the results of the restricted models are tested by applying a F test to determine whether the differences between the in-migration and out-migration models are statistically significant. A maximum likelihood ratio is the more preferred test. However, due to limitations of the SAS statistical software package released

by the SAS Institute a F test was substituted. The F test yields similar results to the maximum likelihood ratio tests.

The F tests show that the beta coefficients are not equal in the labor in-migration and labor out-migration models calibrated (refer to Appendix C). There are significant differences between the restricted and unrestricted models for the labor in-migration and labor out-migration models.

CHAPTER SUMMARY AND CONCLUSIONS

The calibration results of the labor migration models reaffirm the causality problems that are encountered in migration modelling. F tests of whether the coefficients are equal for the three periods studied show that there are significant differences in the coefficients in the two pre-turnaround and turnaround models.

Most of the model calibration results show that basic employment has a negative association with both labor in-migration and labor out-migration, whereas nonbasic employment growth tends to have a positive association with both labor in-migration and labor out-migration.

The data results show that although several of the environmental amenity and disamenity variables have a statistically significant effect on labor in-migration, the relative effect of the environmental amenity and disamenity

variables (as measured by the beta coefficients which show the elasticity of response of the particular variable), is small, with the exception of the income, housing, and crime index variables.

The relative effect of basic and nonbasic employment variables on labor migration is higher than most of the environmental amenity or disamenity variable effects. The relative effect of labor out-migration and labor in-migration on employment is equally high.

The calibration results for the metropolitan county models are different than the nonmetropolitan county calibrations. The metropolitan county model calibrations show that the environmental disamenity variables have a much greater influence in the larger metropolitan counties than they have in the nonmetropolitan counties. The wage rate variable is negatively associated with growth in employment in the larger metropolitan calibrations, whereas the wage rate variable has a positive association with employment growth in the nonmetropolitan counties.

CHAPTER VI

CONCLUSIONS: THE IMPLICATIONS OF THE MODELS

The purpose of this study has been to examine the determinants of labor force migration patterns and their interrelationships with economic deconcentration in the context of the nonmetropolitan turnaround in the 1970s. The study achieves this goal by developing a system of simultaneous equations to test labor migration flows' response to the environment, accessibility factors, and economic activities. Although the model results are not always in the hypothesized direction, the calibration results do reflect structural differences in the pre-turnaround and turnaround model results.

This chapter synthesizes the research findings of this study of labor migration with the research findings on population migration reported in the scholarly literature. The first section presents an overview of the empirical findings of the research models. The second section discusses the research hypotheses in the context of the nonmetropolitan turnaround. The third section compares the results of the labor models with the findings reported in the literature for the population models. The fourth section presents some limitations of labor migration studies

and the data limitations encountered when studying labor migration.

RESEARCH FINDINGS

The scholarly literature indicates that the metropolitan/nonmetropolitan turnaround is a clean break with past migration behavior (Berry, 1976c, 1980; Vining & Strauss, 1977). This break furthermore is not unique to U.S. migration flows, but widespread in the developed world. Migration flows supposedly cascade down the size hierarchy of cities. The basis of this hypothesis emerges from the core-periphery studies in international settlement systems (Vining & Kontuly, 1978; Vining & Pallone, 1982). However, Vining and Kontuly, and Strauss's regional definitions are so broadly based (i.e., Northeast, Midwest, South, and West) that the subregional differences within the regions are overlooked.

An alternative hypothesis to the clean break hypothesis is the period hypothesis that the nonmetropolitan turnaround results from a set of "unique economic and demographic circumstances that converged in the 1970s" (Frey, 1988, p. 262). For instance, the recession of 1973-1974 reduced the ability of the large metropolitan areas to generate jobs, thus leading to numerous economic dislocations and de-industrialization of investments from the larger metropolitan regions. These events supposedly

led to a core-periphery shift in U.S. migration flows that enhanced the growth in manufacturing in the nonmetropolitan counties located in the western and southern peripheries of the United States.

Two hypotheses have been put forth in the scholarly literature as to why the turnaround of jobs and people happened in the United States during the 1970s. One viewpoint is that the turnaround occurred as a result of a population deconcentration process. The other viewpoint is that the turnaround is a result of regional restructuring (Frey, 1988).

The population deconcentration viewpoint links changes in technology and production with residential choice. Wardwell (1980) concludes that residential space-flexibility due to changes in technology and economic institutions allow residents to take advantage of their pent-up residential preferences toward low density locations.

Regional restructuralists view economic dislocations as a short-term de-industrialization episode that leads to a new spatial organization of production (Bluestone & Harrison, 1982; Castells, 1985; Frey, 1987, 1988; Noyelle & Stanbach, 1984). Regional restructuring leads to two regional phenomenon. The first is process by which new industrial centers emerge that will facilitate the expansion of nonroutine manufacturing firms into world markets, the improvement of communication systems and production

technologies and the attraction of multinational headquarters. The second process leads to a shift of routine manufacturing away from large metropolitan areas to smaller metropolitan and nonmetropolitan counties (Frey, 1987, 1988).

This study's research findings show that there are significant structural differences in labor migration flows in the pre-turnaround and turnaround models tested. The F test for equality of coefficients show significant differences in the spatial regions studied. However, the model results show several unexpected results. These unexpected results show the turnaround in the Pacific states is far more complex that the regional development literature suggests.

It is evident from the economic development and demographic literatures that the complexity of the economic and demographic changes in the 1970s requires examining the link between residential preferences and structural change in the labor markets. The 1970s witnessed the impact of three major structural changes on U.S. human settlement patterns: economic de-industrialization (resulting from a worldwide economic crisis that led to heavy disinvestment in economic activities in the larger U.S. metropolitan regions [Bluestone & Harrison, 1982]), economic restructuring (an ongoing economic process that evolved from technological innovations in production, transportation and communications

allowing for greater flexibility in location [Frey, 1987; Noyelle & Stanbach, 1984]), and population deconcentration (a gradual, but sustained shift of population away from large metropolitan regions to smaller regions [Wardwell, 1980]). Each of these social and economic forces leads to different spatial outcomes.

Part of the unexpected results of this study might be attributed to the economic deconcentration process in the Pacific states. As mentioned in the previous chapter, the deconcentration process in the Pacific states is not one in which metropolitan growth spilled over into the nonmetropolitan counties. Both the Pacific metropolitan and nonmetropolitan counties simultaneously experienced de-industrializing (a decline of manufacturing employment and growth of service employment).

In absolute numbers, in the 1960s, the large metropolitan areas had a net gain of labor migrants. But in the 1970s, the large metropolitan areas had a small net loss of labor migrants. It should be pointed out this does not reflect a massive labor out-migration from metropolitan regions, but rather reflects a gradual, not abrupt change in labor migration flows.

Table XXXVI summarizes this study's research hypotheses in the context of labor force migration patterns found in the Pacific states during the nonmetropolitan turnaround period.

TABLE XXXVI

THE DIFFERENCE BETWEEN THE EXPECTED AND THE ACTUAL RELATIONSHIP OF SPECIFIED VARIABLES WITH LABOR MIGRATION

	IN-MIGRATION		OUT-MIGRATION		MAGNITUDE	
	Expected	Actual	Expected	Actual	Expected	Actual
NONADJACENT						
Amenity	+	+/-	-	+	Large	Small
Disamenity	-	+/-	+	+/-	Small	Small
Accessibility	+/-	+/-	+/-	+/-	Large	Large
Basic Employment	+	-	-	-	Small	Small
Nonbasic Employment	+	-	-	+	Small	Small
ADJACENT						
Amenity	+	-	-	+/-	Large	Small
Disamenity	-	+/-	+	+/-	Small	Small
Accessibility	+	+	+	+	Large	Large
Basic Employment	+	+	-	-	Small	Small
Nonbasic Employment	+	+	-	-	Small	Small
METRO < 500,000						
Amenity	+	-	-	+/-	Small	Small
Disamenity	-	+/-	+	+/-	Small	Small
Accessibility	+	+/-	+/-	+/-	Large	Small
Basic Employment	+	-	-	-	Large	Small
Nonbasic Employment	+	-	-	+	Large	Small
METRO > 500,000						
Amenity	+	+/-	-	+/-	Small	Small
Disamenity	-	+/-	+	+/-	Large	Small
Accessibility	+	+/-	+/-	+/-	Large	Small
Basic Employment	+	-	-	-	Large	Small
Nonbasic Employment	+	+	-	+	Large	Small

A GROWING IMPORTANCE OF ENVIRONMENTAL AMENITIES AND ENVIRONMENTAL DISAMENITIES

It has been hypothesized that environmental amenities and disamenities play a significant role in attracting labor migrants to nonmetropolitan counties. As mentioned previously, Stevens (1980) indicates migrants were willing to sacrifice income for amenities in the 1970s. This study attempted to examine whether there was a significant association between labor in-migration and the environmental amenity and disamenity variables in the three Pacific states

during the turnaround period. The following section discusses the influence of the environmental amenity and disamenity variables on labor migration flows in the spatial regions studied.

Nonadjacent Nonmetropolitan Counties

In the nonadjacent nonmetropolitan counties, just one environmental amenity variable, four year college enrollment, has a positive and highly significant association with labor migration during the turnaround period at the 95% level of confidence. The recreational opportunity variable has a positive association with labor in-migration flows in the 1970-1975 model, but the level of significance is just 90%. For the most part, the empirical results support Wardwell's (1980) hypothesis that part of the growth in metropolitan counties was the changing employment structure, which allowed nonmetropolitan residents to live in their preferred residential environment.

Adjacent Nonmetropolitan Counties

Environmental amenities and disamenities are not a major pull or push factor for labor migration flows in the adjacent nonmetropolitan county models. Most of the environmental amenities variables have an insignificant or negative relationship with labor in-migration flows to the

adjacent nonmetropolitan county model results. The only environmental disamenity variable that has a significant and negative association with labor in-migration flows is the age dependency variable. And only one environmental disamenity variable has the expected significant and positive association with labor out-migration flows (the crime index).

Smaller Metropolitan Counties

Environmental amenities have a minor influence on labor migration flows to the smaller metropolitan counties. Just the recreational amenity variable has a significant influence on labor migration flows during the turnaround period. Environmental disamenities, on the other hand, have a significant influence on labor in-migration flows. However, the results are unexpected. Just the crime index has the expected, negative association with labor in-migration flows, whereas age dependency, climate, and housing have a positive and significant influence on labor in-migration flows.

Larger Metropolitan Counties

Environmental amenities have no significant influence on labor in-migration flows to the large metropolitan counties. Urban environmental disamenities are frequently mentioned in the scholarly literature as a major determinant of population deconcentration (Alonso, 1976; Berry, 1976a).

The model results for the metropolitan counties show some support of the disamenities hypothesis. In the turnaround period, most of the disamenity variables show the expected negative relationship with labor in-migration flows, except for the crime rate variable.

THE DECLINING IMPORTANCE OF UNEMPLOYMENT

Although job related reasons are frequently cited as the major motive for relocating, this study finds employment potential (the proxy variable for unemployment) does not act as a push variable in the labor out-migration models. Even though the results found in this study are consistent with the recent economic development literature, it should be noted that part of the reason why this variable is not that important could be the inability to accurately measure the "real" level of unemployment.

Evidence from worker relocation programs show little success in relocating the unemployed worker. In general, place attachment is a strong deterrent to labor out-migration. Only 11% of the displaced workers in the federal job assistance network program in mid-Willamette Valley moved to new labor markets. The majority of those workers who moved were the younger, better educated workers (Office of Technology Assessment, 1986, p. 261).

DECLINING INCOME DIFFERENTIALS OVER TIME

Another primary motive for labor migration identified in the migration literature is the search for economic gain, which has traditionally been equated with increases in monetary income. To test whether relative income in a county is a primary motive for labor migration, this study operationalized income gain as the ratio of median income in a particular county over the median income of the United States. The research hypothesis, therefore, is whether relative income differentials are positively related to labor in-migration and negatively related to labor out-migration.

The model results for testing the income differential variable is ambiguous. In the nonadjacent nonmetropolitan, adjacent nonmetropolitan and small metropolitan county models, the influence of income differentials on labor migration is limited, if not spurious, since several of the coefficients have either an unexpected sign or have a coefficient that is not statistically significant at the 95% level of confidence. In the larger metropolitan county labor out-migration models, the income differential variable has a negative and significant association with labor out-migration flows as expected. But in the larger metropolitan labor in-migration models, the income

differential variable has a positive, but insignificant association with labor in-migration flows.

THE INFLUENCE OF SPATIAL INTERACTION

As mentioned in previous chapters, the assumption of the spatial interaction models is that the flow of migration between two regions is associated with the spatial interaction of the two regions and inversely related to the distance between the two regions. The labor potential index in this dissertation is a measure of the spatial interaction between labor markets. The influence of the labor potential index is positive. The results of this dissertation do not show a declining effect of distance on the interaction between counties in the Pacific states. In fact, the calibrations for the distance coefficient show little variation in the distance elasticity coefficient for the three periods studied (see Appendix A).

DIFFERENTIAL IMPACTS OF ECONOMIC DECONCENTRATION

This study uses the availability of employment activities as the operational measurement for the search for economic opportunities. The employment opportunities variables compare the relative share of employment in an industrial sector with the rest of the nation. The research hypothesis examined for this study is that economic

opportunities as measured by employment activities are negatively associated with labor in-migration and positively associated with labor out-migration.

Previous research indicates increased employment opportunities are a function of two economic processes, restructuring of employment from manufacturing to a service based economy and de-industrialization. To test the importance of restructuring and de-industrialization of production activities in the large metropolitan regions, this study has examined the relationship between basic and nonbasic employment growth with labor force migration. Basic employment is categorized into the following industrial sectors: routine manufacturing, non-routine manufacturing, agriculture, and producer services. The inclusion of producer services within the basic employment sectors rather than nonbasic employment sectors is a result of the linkages between manufacturing industries and producer services identified in the economic development literature.

Markusen (1985) indicates that much of the decline in manufacturing is a result of subcontracting or out-sourcing of traditional manufacturing activities to the producer service sectors.

This study finds the impact of this restructuring and de-industrialization varies according to a region's proximity to metropolitan regions.

Nonadjacent Counties

Employment activities have no significant influence on labor in-migration to nonadjacent nonmetropolitan counties. But labor out-migration has a negative and significant association with growth in basic employment.

Labor migration itself has a significant and positive influence on growth in basic employment. Basic employment growth is not a function of metropolitan de-industrialization, but a function of restructuring within the nonadjacent nonmetropolitan counties. Basic employment growth results from increases in employment activities for producer services. This lends some support to Heaton and Fuguitt's (1979) hypothesis that services played a major role in the nonmetropolitan turnaround in the nonadjacent nonmetropolitan counties.

Growth in nonbasic employment is function of the presence of population over 65 and wage rates in the nonadjacent nonmetropolitan counties. Labor migration has a limited, if not spurious influence on growth in nonbasic employment. The employment opportunities variables for personal service and retail trade and government have an insignificant association with growth in nonbasic employment.

Adjacent Counties

In the adjacent nonmetropolitan counties, employment activities have no significant influence on labor

in-migration flows to the adjacent nonmetropolitan counties. However, labor in-migration shows an unexpected negative influence on growth in basic employment in the adjacent nonmetropolitan model results. However, labor in-migration shows the expected positive influence on growth in nonbasic employment.

The hypothesis that employment growth in the adjacent nonmetropolitan counties is a function of the increased diversity of employment activities in services does appear to be the case. In the 1970s, as employment in manufacturing declined in the adjacent nonmetropolitan counties, employment in producer services increased. The model results further support this hypothesis. Employment opportunities in producer services have a significant association with growth in basic employment. The variables for routine manufacturing and agricultural services, on the other hand, have a negative influence on growth in basic employment activities.

Accessibility as measured by the presence of interstate freeways has a major influence on growth in basic employment.

Growth in nonbasic employment in the adjacent nonmetropolitan counties is associated primarily with labor in-migration, growth in basic employment, and wage rates.

The model results for the adjacent counties show a symbiotic relationship between basic and nonbasic employment growth.

Smaller Metropolitan Areas

The empirical results show the importance of nonroutine manufacturing for growth in basic employment activities in the smaller metropolitan counties. However, as nonroutine manufacturing has grown in importance in the larger metropolitan regions, routine manufacturing has declined in importance in the smaller metropolitan regions. Other employment activities, such as agricultural services and producer services also have a significant association with growth in basic employment.

Larger Metropolitan Areas

It is evident from the empirical results for the large metropolitan statistical areas that labor in-migration is quite responsive to employment decline in basic employment and employment growth in nonbasic employment.

The empirical results show that in the large metropolitan areas of the Pacific states, basic employment growth is associated with employment activities in nonroutine manufacturing and producer services in the 1960s. In the 1970s, the Pacific states, especially the state of California, have become centers for nonroutine production activities such as aerospace, defense, electronics, and

other advanced technology industries. This growth in nonroutine manufacturing activities has been instrumental in the restructuring of the Pacific region's economic base. Nonroutine manufacturing is positively associated with basic employment in the larger metropolitan areas, whereas routine manufacturing is negatively associated with basic employment.

The large metropolitan regions continue to benefit from urban service agglomerations. The nonbasic employment sectors (i.e., retail and government services) have a significant influence on nonbasic employment growth in all periods. Unlike the rest of the nation, agricultural services still play a major role in the metropolitan economies of the Pacific states.

HIGHER WAGES STIMULATE NONMETROPOLITAN GROWTH: LOWER WAGES STIMULATE METROPOLITAN GROWTH

A major stimulus to employment redistribution mentioned in the turnaround literature is relatively low wage rates in nonmetropolitan counties. For example, Kasarda (1988) cites relatively low wage rates as a push factor for basic employment growth in the 1970s. This study finds basic employment growth in the 1970s has a positive relationship to high wage rates in nonmetropolitan areas.

The above symmetry of results do not support Thompson's (1975a) spatial filtering hypothesis. As previously mentioned, Thompson argues that economic

deconcentration is a result of filtering down the national hierarchy of cities from regions of high skilled labor, high wages to regions of low skilled, low wages. There is evidence of filtering from high skilled to low skilled areas, but not filtering down from high wage to low wage areas. As discussed previously, nonroutine manufacturing and producer services are the most significant employment activity in metropolitan regions, while producer services are the most significant basic employment activity in the nonmetropolitan counties.

The unexpected results for the wage rate variables are not unique to the Pacific region. Norcliffe (1984) finds a similar pattern in Canada and Great Britain for nonmetropolitan regions. There is a debate, however, in the scholarly literature whether these higher wages are a proxy measure of residential amenities in nonmetropolitan regions.

According to Scott (1980), the decentralization process of capital intensive firms is

> . . . the consequence of their search for cheap land inputs in the context of diminished locational constraints on the capital side combined with escalating wage rates in the urban periphery. (p. 107)

A RECONFIGURATION OF CENTRAL PLACE ACTIVITIES

The literature review indicates that economic deconcentration facilitates a spatial reconfiguration of central place activities. In part, this is a consequence of

a post-industrial restructuring from a manufacturing based economy to a service based economy, which leads to a decline in industrial agglomeration. Thompson (1975a) suggests the decline of industrial agglomeration "left us with a large number of overgrown cities" (p. 189). Thus, the employment decline in the larger metropolitan areas should not be a surprise.

To test the functional expansion or decline of central place activities hypothesis requires examining the changing economic structure of basic and nonbasic employment. If central place activities are spatially reconfigurating, it would thus follow that producer, personal and retail services are positively related to employment in the smaller metropolitan and nonadjacent regions. The empirical evidence shows that producer and retail services in large metropolitan areas continue to be positively associated with employment. Likewise, the producer service variables are positively related to employment growth in the smaller metropolitan, adjacent nonmetropolitan and nonadjacent nonmetropolitan counties.

There does not appear to be evidence that the central place activities are spatially reconfigurating in the nonmetropolitan counties in the Pacific states. The personal services and retail trade variables are less important in the smaller metropolitan, adjacent

nonmetropolitan and nonadjacent nonmetropolitan county models than in the metropolitan county models.

THE IMPORTANCE OF RETIREMENT

The hypothesis that retirement has a major impact on nonbasic employment growth is supported in the nonadjacent nonmetropolitan county models, but the hypothesis is not supported in the adjacent nonmetropolitan county model results. This relationship has become more significant over time in the non-adjacent nonmetropolitan counties.

THE IMPORTANCE OF ACCESS

Increased access plays a major role in stimulating economic development. The presence of the interstate freeways in nonmetropolitan areas allows for easier movement of goods and services in nonmetropolitan areas. The federal highway administration finds that improved transportation facilitates economic development in rural remote regions. The results for all of the spatial models tested in this study show support for the access hypothesis.

A COMPARISON OF THE LABOR FLOW MODELS WITH THE GENERAL POPULATION FLOW MODELS

Even though the non-working population, such as the youth who are entering the labor force and the elderly who are leaving the labor force, is excluded from the database, the results of the labor model estimation are not

inconsistent with the population flow models reported in the literature review.

Environmental pull variables tend to exert a significant influence on labor in-migration in both flow models. However, the magnitude of the estimated parameters is small. A major labor and population flow models the influence of four-year colleges on labor migration. Fuguitt, Voss, and Doherty's (1979) study on nonmetropolitan growth found in-migration is positively associated with college enrollment. This study finds that college enrollment does have a significant positive association with labor in-migration in the nonadjacent nonmetropolitan county models, but not in the adjacent nonmetropolitan county model results. The large metropolitan county models also show a significant relationship between four year college enrollment and labor in-migration. The variables for recreational opportunities in the nonadjacent nonmetropolitan country modes also show a positive association with migration, but the association is significant only at the 90% level.

Labor force in-migration is less responsive to the economic health variables. This study finds that the economic health variables, as measured by unemployment, income differentials and housing cost, show limited influence on labor migration to nonmetropolitan counties.

Another difference with this study and some of the economic development literature is that this study finds a positive association between wage rates and growth in employment in the nonmetropolitan counties.

The population and labor flow models show more comparable results in the large metropolitan areas. Both the population and labor flow models show a negative relationship between urban disamenities and labor in-migration. Another similarity is the negative association between wage rates and employment growth.

LIMITATIONS OF THE LABOR FLOW MODELS

The research model tested whether the neoclassical economic, human ecological and spatial theories could be integrated into a comprehensive labor flow model. The numeric representation of the model examined labor migration as a function of economic activities, the environment, and accessibility. The labor flow model tested in this study accomplishes this task. All of the specified equations are statistically significant. However, some of the estimated parameters are not as anticipated. For instance, labor out-migration shows a positive association with employment in several of the model calibrations. Employment growth also has an unexplained positive association with labor out-migration.

Only in the larger metropolitan counties does employment growth in the basic sector have the expected negative relationship with labor out-migration during the turnaround period. The labor out-migration estimated parameters are either insignificant or positive in the turnaround models. Growth in non-basic employment, however, shows an expected relationship with out-migration, except in the 1970-1975 metropolitan area model.

The estimated signs for labor in-migration are almost identical to the labor out-migration calibrations. Only in the 1960-1965 model does the calibration results for labor in- and out-migration have the opposite results.

This study attempted to test formally the symmetry hypothesis for labor migration. The hypothesis tests for symmetry are rejected. The symmetry tests show that the coefficients for labor in-migration and labor out-migration in the Pacific states are not equal.

A major problem with the labor migration models is the underlying assumptions of migration models. The results for the aggregate ecological models reported in the population turnaround literature encounter the same problems as the neoclassical economic models. The aggregate net migration models distort the impact of structural change at the origin and destination points and do not really show the magnitude of the response to migration change in the structure of an organization (Pol, Schafer, & Sly, 1984). Pol, Schafer, and

Sly developed an ecological model that recognizes that migration and ecological structure is more complex than originally perceived. Their work disaggregated the flow of migration into the South according to the in- and out-components of the migration flows. The rationale of the approach is that in- and out-flows ". . . are themselves demographic processes and as much should be influenced by the structural conditions operating in ecological systems" (pp. 2-3).

Another flaw in migration modelling is the assumption that out-migration is a rational act. Ballard and Clark's (1981) study of inter-state migration flows found labor in-migration is responsive to economic conditions, but their results show no symmetry between laborers who out-migrated from "depressed" regions and laborers who in-migrated to "growing regions" (p. 227). This study finds similar results, labor in-migration is responsive to a few of the environmental amenities but not responsive to employment opportunities at the destination, while labor out-migration is responsive to employment opportunities. The most consistent result in the model calibrations is the response of labor migration flows to the accessibility variables.

Both the ecological and economic models are based on equilibrium models. The economic assumptions are derived from Adam Smith's competitive market assumptions, which assert there are no barriers for capital and labor mobility

(cited in Clark, 1983). Labor migrants are economically rationale consumers seeking to maximize their economic opportunities. Isard (1960) states that there are spatial market imperfections. Information does not flow freely from one area to another. Labor migrants are not always aware of economic opportunities in other regions, especially in the nonadjacent nonmetropolitan areas.

FURTHER COMMENTS--BARRIERS TO MOBILITY

The limitation of the labor flow model affirm the complexity of migration modelling. In general, the literature review discusses several weak points in the ecological and neoclassical models. Both the ecological and neoclassical models are macro models, which fail to address the issues of cultural values and motivation in migration. Individuals have strong place attachment to their current environment. In the Pacific nonmetropolitan counties, the economic culture has evolved around the resource based industries, such as lumber, agriculture and mining. Even when there occurs a decline in lumber production leaving limited employment alternatives, workers do not always move away (Hibbard, 1989).

Without an understanding of the cultural context of the individual, one cannot evaluate the micro and macro linkages in the environment. Dejong (1984) contends migration research needs to evaluate how micro and macro

linkages relate to the individuals perception of the environment. For instance, the literature review notes three primary motives for migration: employment, amenities, and social factors. This study, due to the limitations of the database, does not address the link between social factors and employment and amenities. Moving is a stressful life event, which incurs both monetary, psychic, and social costs. Those most prone to economic stress are the least likely to move. Generally, there are several social and economic deterrents to labor migration, such as:

1. Structural Disequilibrium. A major barrier to moving appears to be the structural disequilibrium in the economic base. Most nonmetropolitan counties in the Pacific Northwest and northern California are dependent on lumber based industries. Thus their economies are subject to cyclical employment opportunities. The cyclical and long-term nature of the lumber industry is regionwide, leaving unemployed millworkers with few opportunities in the region for employment.

2. Location Specific Capital. Another barrier to mobility is "location-specific" capital, such as long-term residency and home-ownership. Williams and McMillen's (1983) found the migrants with dense social networks are less likely to move. In addition, the greater the commitment an individual has to his occupational, social and organizational involvement, the less likely the individual

is willing to relocate. The CWHS (U.S. Economic, 1976a) data reflect that labor migrants who leave the nonmetropolitan areas are younger than those who remain behind.

3. Previous Exposure to the Environment. The preference literature cites that experience or exposure to a particular environment increases the likelihood an individual will relocate. The single most preferred residence is a person's current residence. Previous experience in an environment; such as childhood experience, travel, or prior mobility; enables an individual to decide about the qualities of a particular community (Zuiches, 1981).

DATA LIMITATIONS

The unexpected findings of the labor flow model and the lack of not addressing the linkages between social factors and the broader structural environment point to the need for research in nonmetropolitan areas to focus not just on the macro area, but on the micro decision of labor migration as well. There is a need to combine aggregate secondary data with qualitative data. The secondary data allow the researcher to generalize to larger regions. However, the aggregation does not allow the researcher to examine the uniqueness of growing or declining areas.

Although the model calibrations for this study have high coefficients of determinations, there remain several unanswered questions. Part of the problem is the cost involved in collecting primary data, which is derived from a reliance on data collected by public agencies for population counts, rather than data collected to study a social phenomenon such as labor migration.

The major limitation is the paucity of available secondary data. The Census long form (the Public Use Micro Sample) provides detailed information on individual characteristics, but lacks the necessary spatial information for origin destination models (Isserman, Plane, & McMillen, 1982). The annual Current Population Survey provides information on such migration characteristics as age, gender, and occupation, but it is reliable only for the census regions (Isserman, Plane, & McMillen, 1982). The Internal Revenue Service data provides only limited information on individual characteristics at the state and county level (Isserman, Plane, & McMillen, 1982). Few of these data sets provide information on areal characteristics, such as amenities and employment opportunities, within individual counties. This study was able to merge various areal characteristic with information on migrant characteristics to study the areal characteristics that attracted labor migrants during the turnaround. But the data limitations did not allow

determining the difference in labor migration patterns by race, marital status, level of education, labor force status, and presence of children. This presents a problem when one desires to examine both the determinants of the destination county and the determinants of the origin county.

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APPENDIX A

THE MODELS USED TO CALCULATE THE LABOR POTENTIAL INDEX

MODEL A1

MODEL RESULTS FOR CALIBRATING NONLINEAR ESTIMATES OF LABOR POTENTIAL MODEL

logflow= B_0 + B_1*log(population at origin) + B_2*log(population at destination) + B_3*log(dij)+ error

					Explained	Error
	*B*0	*B*1	*B*2	*B*3	Sums	Sums
1965 Origin Model						
Nonadjacent	4.14	-0.978	-0.031	-0.131	269303	452
Adjacent	3.75	-0.9504	-0.038	-0.164	224414	406
Small Metro	3.52	-0.9210	-0.113	-0.331	146228	475
Large Metro	3.52	-0.744	-0.223	-0.496	199517	1110
1970 Origin Model						
Nonadjacent	4.000	-0.972	0.040	-0.132	268855	478
Adjacent	3.870	-0.942	0.050	-0.164	222943	515
Small Metro	3.341	-0.915	0.149	-0.332	145029	549
Large Metro	1.113	-0.765	0.265	0.496	198508	1183
1975 Origin Model						
Nonadjacent	4.060	-0.973	0.027	-0.132	269893	394
Adjacent	3.750	-0.948	0.036	-0.165	224397	388
Small Metro	3.550	-0.912	0.135	-0.332	144886	547
Large Metro	1.000	-0.729	-0.504	-0.496	196031	1264
1965 Destination Model						
Nonadjacent	4.141	0.022	-0.969	-0.116	363968	452
Adjacent	3.750	0.049	-0.961	-0.139	264925	406
Small Metro	3.520	0.078	-0.886	-0.350	104509	475
Large Metro	1.290	0.255	-0.776	-0.568	106289	1110
1970 Destination Model						
Nonadjacent	4.033	0.030	-0.973	-0.116	269404	427
Adjacent	3.740	0.048	-0.950	-0.139	262460	457
Small Metro	3.520	0.126	-0.901	-0.350	145764	525
Large Metro	1.233	0.261	-0.736	-0.568	195833	1199
1975 Destination Model						
Nonadjacent	4.007	0.036	-0.969	-0.115	268967	450
Adjacent	3.590	0.052	-0.940	-0.139	223247	507
Small Metro	3.290	0.155	-0.916	-0.350	144795	562
Large Metro	1.255	0.284	-0.791	0.568	198453	1241

APPENDIX B

A COMPARISON OF THE CONTROLLED AND UNCONTROLLED ADJACENT MODELS

COMPARISON B1

A COMPARISON OF ADJACENT LABOR MIGRATION MODELS

	ADJACENT OUT-MIGRATION MODEL		ADJACENT IN-MIGRATION MODEL	
VARIABLE	UNRESTRICTED MODEL	RESTRICTED MODEL	UNRESTRICTED MODEL	RESTRICTED MODEL
ECONOMIC ACTIVITIES				
BASIC	-2.064	-1.937	0.762	-1.937
NONBASIC	0.216	-2.001	1.306	-2.001
ENVIRONMENTAL AMENITIES				
COLLEGE	1.903	2.888	0.723	2.880
EXPENDITURES	-0.728	-0.617	-0.134	-0.062
RECREATION	-1.837	-1.678	1.408	-1.678
INCOME	0.614	0.412	1.297	0.412
ENVIRONMENTAL DISAMENITIES				
AGE DEPENDENCY	0.264	0.862	-2.606	0.862
UNEMPLOYMENT	-0.252	-0.846	-0.888	-0.846
NONWHITE	0.233	1.042	0.873	1.042
CRIME	6.446	6.984	0.549	6.984
CLIMATE	-1.229	-0.400	1.699	-0.400
HOUSING	-1.613	-2.256	-1.359	-2.256
ACCESSIBILITY				
GRAVITY	3.157	18.747	10.231	18.747
CONTIGUOUS	1.109	1.608	-1.056	1.608
POPULATION	-16.434	-76.236	-49.796	-76.236

COMPARISON B2

A COMPARISON OF ADJACENT BASIC
EMPLOYMENT MODELS

BASIC EMPLOYMENT				
OUT-MIGRANTS	2.695	6.801	-5.273	6.801
NONBASIC	-77.473	-15.122	19.537	-15.122
ROUTINE MFG	-8.596	-9.864	-6.034	-9.864
AGRICULTURE	-6.399	-5.164	-5.160	-5.164
PRODUCER	0.215	0.228	6.155	0.228
ENERGY	2.458	0.966	10.196	0.966
WAGES	3.332	-0.487	-0.950	-0.487
FREEWAY	-0.685	-3.679	9.083	-3.679

COMPARISON B3

A COMPARISON OF ADJACENT NONBASIC
EMPLOYMENT MODELS

OUT-MIGRANTS	-1.339	-22.063	2.047	-28.102
BASIC	-84.339	-63.831	16.769	-58.311
PERSONAL SERVICE	14.529	-10.813	8.068	-4.312
RETAIL	-16.731	4.296	-25.598	-2.518
GOVERNMENT	-4.691	-9.329	-11.799	-12.625
WAGES	-3.144	9.624	-7.302	-5.493
RETIREMENT	-0.039	14.261	10.081	11.528

APPENDIX C

F TESTS OF MODELS

METHODOLOGY USED FOR F TEST FOR TEMPORAL COMPARISONS

To test whether the coefficients of the three different periods are equal, an F test is performed that compares whether the restricted sum of squares of the errors are equal to the unrestricted sum of squares of the errors. The restricted model is the combined model for all periods. This formula is frequently used to test equality of coefficients of different regressions (Pindyck & Rubinfeld, 1981, pp. 123-125).

The hypothesis test for the combined model is:

$$H_o: \beta_i = \gamma_i = \theta_i.$$

This test assumes if the null hypothesis is true, the regression results for the different periods are assumed to be equal. To perform the test of equality, it is assumed that the coefficients of the turnaround model would be equal to the coefficients of the two pre-turnaround models. Therefore, for this study, the turnaround period coefficients are used to impose the coefficient restrictions on the combined model (Pindyck & Rubinfeld, 1981, p. 125).

$$F = \frac{(ESS_R - ESS_{UR})/k}{ESS_{UR}/(N-3k)}$$

where ESS_R = Error of restricted (the combined models[1]

ESS_{UR} = Error of unrestricted models[2]

N = number of cases

k = 16 (the 15 coefficients in the labor model plus the intercept coefficient).

---

[1]The restricted error is the sum of errors for all three temporal models combined, which are the data files for labor migration flows for the periods 1960-1965, 1965-1970 (the two pre-turnaround periods), and 1970-1975 (the turnaround period).

[2]The unrestricted model is the sum of the errors for the three unrestricted models, in other words $ESS_{UR} = ESS_{1960\text{-}1965} + ESS_{1965\text{-}1970} + ESS_{1970\text{-}1975}$.

TEST C1

COMPARING THE DESTINATION TURNAROUND MODEL WITH THE PRE-TURNAROUND MODELS

Spatial Region K=16	Restricted Error	Unrestricted Error	$ESS_1+ESS_2+ESS_3$*	N	F
Nonadjacent	11056	8217	488+6103+1626	**22167**	479.5
Adjacent	3128	3078	620+1204+1254	16221	16.44
Small Metro	9905	5086	1171+2256+1659	6717	396.2
Large Metro	26336	8261	8261+6045+1596	7437	304.7

TEST C2

THE ORIGIN TURNAROUND MODEL WITH THE PRE-TURNAROUND MODELS

Spatial Region k=16	Restricted Error	Unrestricted Error	$ESS_1+ESS_2+ESS_3$*	N	F
Nonadjacent	4927	2476	1427+628+421	**22167**	1291.7
Adjacent	3617	3090	485+1822+783	16221	172.62
Small Metro	3896	3674	1394+723+1536	1536	404.37
Large Metro	12685	5798	1097+1982+2719	7437	404.37

*$ESS_1+ESS_2+ESS_3$ = The sum of squares of the errors for the 1960-1965 model + the sum of squares of the errors for the 1965-1970 model + the sum of squares of the errors for the 1970-1975 model.

METHODOLOGY USED FOR F TESTS USED TO COMPARE SPATIAL REGIONS

$$F = \frac{(ESS_R - ESS_{UR})/k}{ESS_{UR}/(N+M-2k)}$$

where ESS_R = Error of restricted model[1]
ESS_{UR} = Error of unrestricted model[2]
N = number of cases of region$_1$
M = number of cases of region$_2$

---

[1]The restricted models are calibrated from the combined data files, i.e. nonmetropolitan = nonadjacent + adjacent and metropolitan = small metro + large metro counties.

[2]The unrestricted model's sum of errors for nonmetropolitan = $ESS_{nonadjacent}$ and $ESS_{adjacent}$ and metropolitan = $ESS_{small\ metropolitan}$ and $ESS_{large\ metropolitan}$.

TEST C3

THE NONMETROPOLITAN AND METROPOLITAN DESTINATION MODEL COMPARISONS

Spatial Region K=16	Restricted Error	Unrestricted* Error	N + M	F
Nonmetro	3842	2880	12796	266.51
(Nonadjacent + Adjacent)				
Metro	4476	3255	4718	110.59
(Small Metro + Large Metro)				

TEST C4

THE NONMETROPOLITAN AND METROPOLITAN ORIGIN MODEL COMPARISONS

Spatial Region K=16	Restricted Error	Unrestricted* Error	N + M	F
Nonmetro	1720	1204	12796	358.33
*(Nonadjacent + Adjacent)				
Metro	4722	4275	4718	30.633
*(Small Metro + Large Metro)				

* The Combined models (the restricted model)

Note Unrestricted Error varies according to:

1) Nonmetropolitan = the sum of squares of the errors for the nonadjacent + the adjacent nonmetropolitan models.

2) Nonmetropolitan = the sum of squares of the errors for the nonadjacent + the adjacent nonmetropolitan models.

F TEST FOR COMPARISON OF LABOR IN-MIGRATION AND LABOR OUT-MIGRATION MODELS[1]

$$F = \frac{(ESS_R - ESS_{UR})/k}{ESS_{UR}/(N-2k)}$$

where ESS_R = Error of restricted model[1]

ESS_{UR} = Error of unrestricted model[2]

N = number of cases

k = 16

---

[1]To test whether the parameters are equal for the 1975 labor in-migration and labor out-migration models, the parameter coefficients (B_i) in the labor in-migration model have been set equal to the parameter coefficients in the labor out-migration model and vice versa. The resulting error of the sums of square of the restricted model is then compared to the unrestricted labor in-migration model to test whether the difference is statistically significant or not. If the difference is statistically significant, then one cannot say that the beta coefficients of the restricted and unrestricted models are equal. In other words, one cannot say that the beta coefficients in the labor in-migration model and the labor out-migration model are equal.

[1]Restricted model is combined models for labor in-migration and labor out-migration for the turnaround period (1970-1975).

[2]The unrestricted model sum of squares (ESS_{UR})=$ESS_{\text{In-Migration Model}}$ + $ESS_{\text{Out-Migration Model}}$.

TEST C5

LABOR MIGRATION MODEL TESTS

Spatial Region K=16	Restricted Error	Unrestricted* Error	N	F
Nonadjacent	3405	2047	14778	612.82
Adjacent	5499	2037	5375	1145.44
Small Metro	3516	3215	4478	26.02
Large Metro	10586	4315	4958	447.928

*Restricted Model= Combined Labor In-migration + Labor Out-Migration Model (Testing Ho: H_o: $\beta_i = \gamma_i$).

Unrestricted = The sum of squares of error for labor in-migration model + the sum of squares of error for labor out-migration model.

APPENDIX D

LIST OF STANDARD ERRORS OF THE MODEL RESULTS

LIST D1

LIST OF STANDARD ERRORS FOR NONADJACENT COUNTIES
LABOR OUT-MIGRATION MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	0.207	0.089	2.323	5.466	5.550	0.985	3.935	3.492	1.127
EMPLOYMENT VARIABLES									
BASIC EMPLOYMENT	-0.001	-0.097	0.011	-0.062	-5.088	0.012	-0.047	-4.409	0.011
NONBASIC EMPLOYMENT	-0.026	-1.137	0.023	-0.005	-0.980	0.005	0.001	0.170	0.008
ENVIRONMENTAL AMENITIES									
COLLEGE	0.002	0.836	0.002	0.001	1.016	0.001	-0.005	-0.791	0.007
EXPENDITURES	0.007	0.862	0.008	-0.006	-1.848	0.003	-0.001	-0.385	0.003
RECREATION	0.008	1.200	0.007	0.009	2.140	0.004	0.002	0.493	0.003
INCOME	-0.477	-1.607	0.297	0.214	1.612	0.133	0.093	0.568	0.164
ENVIRONMENTAL DISAMENITIES									
AGE DEPENDENCY	-0.163	-2.118	0.077	-0.021	-0.396	0.053	-0.033	-0.816	0.040
UNEMPLOYMENT	0.002	0.820	0.003	0.001	1.345	0.001	-0.000	-0.067	0.001
NONWHITE	0.018	2.370	0.007	-0.003	-0.807	0.004	-0.001	-0.100	0.005
CRIME	0.027	0.726	0.037	0.025	4.688	0.005	0.040	9.417	0.004
CLIMATE	-0.054	-1.186	0.046	-0.087	-3.306	0.026	-0.043	-2.140	0.020
HOUSING	0.037	0.890	0.041	-0.028	-1.310	0.021	-0.021	-1.122	0.019
ACCESSIBILITY									
GRAVITY	0.036	10.333	0.003	0.092	10.164	0.009	0.073	7.169	0.010
CONTIGUOUS	2.336	0.790	2.957	0.900	1.521	0.591	0.200	0.359	0.556
POPULATION	-0.970	-24.021	0.040	-1.092	-53.792	0.020	-1.044	-55.470	0.019
F-VALUE	3565.429			7877.195			11764.322		
PROB >	0.000			0.000			0.000		
R SQUARE	0.879			0.941			0.960		
ADJUSTED R	0.879			0.941			0.960		
EXPLAINED SUM SQUARES	10351.254			10064			10082		
ERROR SUM SQUARES	1427.227			628			421		

LIST D2

LIST OF STANDARD ERRORS FOR NONADJACENT LABOR OUT-MIGRATION BASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	3.828	42.758	0.090	1.967	14.139	0.139	2.906	22.117	0.131
EXOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	0.055	3.589	0.015	0.478	23.670	0.020	0.237	11.837	0.020
NONBASIC EMPLOYMENT	0.624	14.560	0.043	-0.725	-60.169	0.012	-0.863	-73.494	0.012
INDEPENDENT VARIABLES									
AGRICULTURAL SERVICES	-0.162	-9.116	0.018	-0.137	-4.976	0.028	-0.136	-5.156	0.026
ROUTINE MANUFACTURING	-0.476	-14.427	0.033	-0.346	-7.074	0.049	-0.238	-5.076	0.047
PRODUCER	0.226	4.533	0.050	0.208	5.884	0.035	0.142	4.151	0.034
ENERGY	-0.401	-11.767	0.034	-0.068	-1.333	0.051	0.006	0.113	0.049
WAGES	1.205	14.564	0.083	-0.087	-0.922	0.094	-0.126	-1.397	0.090
FREEWAY	0.301	6.471	0.047	-0.208	-1.420	0.146	-0.917	-6.491	0.141
F VALUE	212.190			838.828			1071.005		
PROB >	0.000			0.000			0.000		
R SQUARE	0.187			0.476			0.537		
ADJUSTED R	0.186			0.476			0.537		
EXPLAINED SUM SQUARES	2356.925			19288			22736		
ERROR SUM SQUARES	10248.142			21215			19586		

LIST D3

LIST OF STANDARD ERRORS FOR NONADJACENT LABOR OUT-MIGRATION NONBASIC EMPLOYMENT

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	-1.124	-9.113	0.123	2.536	8.083	0.314	5.042	18.711	
ENDOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	0.111	7.475	0.015	0.707	17.219	0.041	0.335	9.803	0.034
BASIC EMPLOYMENT	0.029	2.755	0.010	-1.149	-61.281	0.019	-1.041	-72.095	0.014
INDEPENDENT VARIABLES									
PERSONAL SERVICES/RETAIL	-0.137	-1.142	0.120	1.090	5.537	0.197	0.010	0.058	0.164
GOVERNMENT	-0.099	-3.594	0.027	-0.164	-2.072	0.079	-0.344	-5.081	0.068
RETIREMENT	-0.193	-7.369	0.026	-0.232	-2.185	0.106	0.527	5.788	0.091
WAGES	-0.352	-3.422	0.103	-0.464	-2.572	0.180	0.210	1.363	0.154
F VALUE	224.119			756.336			1170.291		
PROB > F	0.000			0.000			0.000		
R SQUARE	0.154			0.381			0.488		
ADJUSTED R	0.153			0.380			0.487		
EXPLAINED SUM SQUARES	731.088			19867			22496		
ERROR SUM SQUARES	4013.949			32323			23653		

LIST D4

LIST OF STANDARD ERRORS FOR NONADJACENT COUNTIES
LABOR IN-MIGRATION MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	3.372	6.945	0.486	9.190	1.686	5.451	4.571	4.427	1.033
EMPLOYMENT VARIABLES									
BASIC EMPLOYMENT	0.011	1.340	0.008	-0.003	-0.109	0.026	-0.002	-0.147	0.012
NONBASIC EMPLOYMENT	-0.004	-0.230	0.017	-0.012	-0.273	0.045	0.004	0.189	0.021
ENVIRONMENTAL AMENITIES									
COLLEGE	0.001	0.952	0.001	0.004	1.250	0.003	0.006	1.960	0.003
EXPENDITURES	-0.007	-2.792	0.003	-0.001	-0.112	0.008	-0.002	-0.425	0.004
RECREATION	0.009	2.588	0.004	0.017	1.286	0.014	0.012	1.712	0.007
INCOME	0.015	0.242	0.064	0.843	1.075	0.784	0.195	1.464	0.133
ENVIRONMENTAL DISAMENITIES									
AGE DEPENDENCY	-0.110	-3.061	0.036	0.107	0.575	0.186	0.065	0.662	0.098
UNEMPLOYMENT	-0.002	-2.037	0.001	0.001	0.225	0.005	-0.002	-0.835	0.002
NONWHITE	0.003	1.169	0.003	0.001	0.076	0.017	-0.001	-0.097	0.009
CRIME	0.014	2.552	0.005	0.037	1.007	0.037	0.026	1.354	0.019
CLIMATE	-0.008	-0.478	0.016	-0.052	-0.651	0.079	-0.025	-0.592	0.041
HOUSING	-0.074	-3.402	0.022	0.026	0.355	0.074	0.021	0.511	0.040
ACCESSIBILITY									
GRAVITY	0.039	7.371	0.005	0.025	2.525	0.010	0.040	11.588	0.003
CONTIGUOUS	-0.155	-0.479	0.324	5.336	1.570	3.399	2.592	1.442	1.798
POPULATION	-0.992	-84.723	0.012	-0.974	-21.103	0.046	-0.991	-43.174	0.023
F-VALUE	17179.910			828.929			3083.090		
PROB >	0.000			0.000			0.000		
R SQUARE	0.972			0.628			0.863		
ADJUSTED R	0.972			0.627			0.862		
EXPLAINED SUM SQUARES	17317			10297			10203		
ERROR SUM SQUARES	488			6103			1626		

LIST D5

LIST OF STANDARD ERROR FOR NONADJACENT BASIC EMPLOYMENT LABOR IN-MIGRATION MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	2.591	23.256	0.111	2.390	39.911	0.060	2.532	40.908	0.062
EXOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	-0.064	-4.641	0.014	0.178	18.734	0.009	0.187	19.979	0.009
NONBASIC EMPLOYMENT	0.535	8.465	0.063	0.532	15.270	0.035	0.528	15.678	0.034
INDEPENDENT VARIABLES									
AGRICULTURAL SERVICES	-0.036	-1.672	0.022	-0.021	-1.460	0.014	-0.055	-3.879	0.014
ROUTINE MANUFACTURING	-0.458	-15.398	0.030	-0.185	-9.319	0.020	-0.218	-9.993	0.022
PRODUCER	0.163	2.315	0.070	0.198	8.027	0.025	0.321	11.153	0.029
ENERGY	0.152	3.998	0.038	-0.194	-8.564	0.023	-0.238	-10.207	0.023
WAGES	0.713	7.356	0.097	0.554	12.077	0.046	0.557	10.626	0.052
FREEWAY	-0.181	-4.637	0.039	1.130	15.271	0.074	1.281	16.670	0.077
F VALUE	131.624			186.162			220.262		
PROB >	0.000			0.000			0.000		
R SQUARE	0.125			0.168			0.193		
ADJUSTED R	0.124			0.167			0.192		
EXPLAINED SUM SQUARES	1387			932			1152		
ERROR SUM SQUARES	9728			4615			4824		

LIST D6

LIST OF STANDARD ERRORS FOR NONADJACENT NONBASIC EMPLOYMENT LABOR IN-MIGRATION MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	-0.437	-4.756		-0.213	-2.154		1.200	9.026	
ENDOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	0.125	11.145	0.011	-0.015	-1.223	0.012	-0.010	-0.624	0.015
BASIC EMPLOYMENT	0.049	2.956	0.017	-0.059	-3.938	0.015	-0.101	-6.193	0.016
INDEPENDENT VARIABLES									
PERSONAL SERVICES/RETAIL	-0.762	-6.559	0.116	0.213	3.566	0.060	-1.278	-10.028	0.127
GOVERNMENT	-0.085	-2.738	0.031	-0.251	-9.442	0.027	-0.386	-13.084	0.030
RETIREMENT	0.021	0.716	0.029	0.164	6.874	0.024	0.438	16.708	0.026
WAGES	0.582	5.703	0.102	-0.715	-12.886	0.055	0.494	4.445	0.111
F VALUE	56.739			152.757			128.917		
PROB > F	0.000			0.000			0.000		
R SQUARE	0.044			0.111			0.095		
ADJUSTED R	0.043			0.110			0.094		
EXPLAINED SUM SQUARES	210			392			388		
ERROR SUM SQUARES	4572			3158			3706		

LIST D7

LIST OF STANDARD ERRORS FOR ADJACENT COUNTIES
LABOR OUT-MIGRATION MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	3.123	2.045	1.527	2.337	1.261	1.853	1.752	0.830	2.111
EMPLOYMENT VARIABLES									
BASIC EMPLOYMENT	-0.006	-0.905	0.006	-0.003	-0.077	0.037	-0.047	-1.583	0.029
NONBASIC EMPLOYMENT	-0.052	-3.753	0.014	-0.030	-1.697	0.018	-0.033	-2.010	0.016
ENVIRONMENTAL AMENITIES									
COLLEGE	0.002	0.498	0.004	-0.003	-0.641	0.005	0.006	0.564	0.011
EXPENDITURES	-0.008	-1.297	0.006	-0.012	-1.521	0.008	-0.008	-1.115	0.007
RECREATION	-0.000	-0.001	0.005	0.007	1.115	0.006	0.003	0.416	0.006
INCOME	-0.029	-0.133	0.218	0.016	0.065	0.245	-0.171	-0.580	0.295
ENVIRONMENTAL DISAMENITIES									
AGE DEPENDENCY	-0.080	-0.981	0.081	-0.160	-1.517	0.106	-0.192	-3.427	0.056
UNEMPLOYMENT	-0.001	-0.346	0.002	-0.002	-0.728	0.002	-0.002	-0.846	0.002
NONWHITE	-0.016	-1.974	0.008	0.012	0.991	0.012	0.010	0.870	0.011
CRIME	-0.001	-0.102	0.007	0.027	2.850	0.009	0.025	3.059	0.008
CLIMATE	-0.023	-0.967	0.024	0.012	0.378	0.032	-0.017	-0.576	0.029
HOUSING	0.005	0.147	0.035	-0.014	-0.349	0.040	-0.070	-2.176	0.032
ACCESSIBILITY									
GRAVITY	0.047	7.158	0.007	0.043	1.035	0.042	0.052	1.707	0.031
CONTIGUOUS	-0.294	-0.414	0.710	-0.964	-0.860	1.121	-1.059	-1.096	0.966
POPULATION	-1.008	-76.943	0.013	-0.917	-9.891	0.093	-0.978	-13.666	0.072
F-VALUE	3077.705			1822.601			2069.167		
PROB >	0.000			0.000			0.000		
R SQUARE	0.895			0.835			0.852		
ADJUSTED R	0.895			0.835			0.852		
EXPLAINED SUM SQUARES	4157			4466			4508		
ERROR SUM SQUARES	486			1822			783		

LIST D8

LIST OF STANDARD ERRORS FOR ADJACENT LABOR OUT-MIGRATION BASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	2.576	12.187	0.211	1.511	3.805	0.397	1.544	4.550	0.339
EXOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	-0.190	-7.783	0.024	0.113	2.387	0.047	0.001	0.026	0.040
NONBASIC EMPLOYMENT	0.275	7.317	0.038	-0.780	-60.168	0.013	-0.815	-65.199	0.013
INDEPENDENT VARIABLES									
AGRICULTURAL SERVICES	-0.333	-14.431	0.023	-0.128	-4.955	0.026	-0.113	-4.294	0.026
ROUTINE MANUFACTURING	-0.292	-11.433	0.026	-0.209	-6.145	0.034	-0.232	-6.513	0.036
PRODUCER	0.299	6.038	0.050	0.075	1.032	0.073	-0.042	-0.475	0.089
ENERGY	0.911	17.045	0.053	-0.249	-3.731	0.067	-0.019	-0.288	0.067
WAGES	1.128	18.163	0.062	-0.168	-1.882	0.089	0.087	1.053	0.083
FREEWAY	0.510	12.696	0.040	0.257	4.545	0.056	0.216	2.352	0.092
F VALUE	363.837			760.535			808.475		
PROB >	0.000			0.000			0.000		
R SQUARE	0.350			0.530			0.545		
ADJUSTED R	0.349			0.529			0.544		
EXPLAINED SUM SQUARES	3718			13060			14090		
ERROR SUM SQUARES	6897			11589			11761		

LIST D9

LIST OF STANDARD ERRORS FOR ADJACENT LABOR OUT-MIGRATION BASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	-1.272	-9.458	0.134	2.301	7.024	0.328	2.710	8.570	0.316
ENDOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	0.169	10.599	0.016	0.148	3.587	0.041	0.057	1.480	0.039
BASIC EMPLOYMENT	0.115	10.110	0.011	-1.140	-60.308	0.019	-1.122	-65.523	0.017
INDEPENDENT VARIABLES									
PERSONAL SERVICES/RETAIL	-1.181	-6.738	0.175	-0.236	-1.174	0.201	-0.009	-0.044	0.198
GOVERNMENT	-0.703	-18.351	0.038	-0.321	-3.439	0.093	-0.145	-1.596	0.091
RETIREMENT	-0.601	-14.261	0.042	-0.007	-0.075	0.091	0.037	0.409	0.090
WAGES	0.990	6.782	0.146	0.693	3.776	0.184	0.602	3.349	0.180
F VALUE	126.930			1015.905			1149.350		
PROB > F	0.000			0.000			0.000		
R SQUARE	0.124			0.530			0.561		
ADJUSTED R	0.123			0.530			0.560		
EXPLAINED SUM SQUARES	385			18682			20813		
ERROR SUM SQUARES	2731			16553			15808		

LIST D10

LIST OF STANDARD ERROR FOR ADJACENT COUNTY LABOR IN-MIGRATION MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	2.430	3.348	0.726	-1.574	-0.796	1.978	2.276	3.076	0.740
EMPLOYMENT VARIABLES									
BASIC EMPLOYMENT	0.026	1.922	0.013	0.003	0.158	0.018	0.010	0.837	0.012
NONBASIC EMPLOYMENT	-0.048	-1.714	0.028	-0.008	-0.140	0.056	0.026	0.575	0.045
ENVIRONMENTAL AMENITIES									
COLLEGE	0.001	0.494	0.002	-0.001	-0.112	0.009	0.003	0.443	0.007
EXPENDITURES	-0.013	-3.237	0.004	-0.008	-0.602	0.014	0.005	0.524	0.010
RECREATION	0.018	3.346	0.005	0.002	0.241	0.009	0.012	1.794	0.007
INCOME	-0.033	-0.341	0.096	-0.666	-2.599	0.256	0.085	1.156	0.073
ENVIRONMENTAL DISAMENITIES									
AGE DEPENDENCY	-0.109	-2.149	0.051	-0.089	-0.488	0.182	-0.073	-0.541	0.134
UNEMPLOYMENT	-0.000	-0.178	0.002	-0.006	-1.327	0.005	-0.004	-1.137	0.003
NONWHITE	0.005	1.321	0.004	0.005	0.205	0.023	0.025	1.367	0.018
CRIME	0.012	1.422	0.008	-0.007	-0.340	0.019	0.013	0.956	0.014
CLIMATE	0.004	0.119	0.030	-0.005	-0.103	0.051	0.073	1.697	0.043
HOUSING	-0.064	-2.004	0.032	-0.025	-0.362	0.070	-0.055	-1.069	0.051
ACCESSIBILITY									
GRAVITY	0.087	5.314	0.016	0.073	5.673	0.013	0.077	6.863	0.011
CONTIGUOUS	-0.744	-1.304	0.571	-2.318	-1.790	1.295	-1.639	-1.482	1.106
POPULATION	-1.028	-51.999	0.020	-1.016	-24.281	0.042	-0.976	-36.347	0.027
F-VALUE	7364.278			645.400			1293.007		
PROB >	0.000			0.000			0.000		
R SQUARE	0.954			0.721			0.782		
ADJUSTED R	0.953			0.720			0.782		
EXPLAINED SUM SQUARES	12709			3109			4512		
ERROR SUM SQUARES	620			1205			1255		

LIST D11

LIST OF STANDARD ERRORS FOR ADJACENT LABOR IN-MIGRATION BASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	2.620	20.323	0.129	0.674	2.030	0.332	1.789	6.290	0.284
EXOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	-0.063	-3.951	0.016	-0.184	-4.815	0.038	-0.168	-5.498	0.031
NONBASIC EMPLOYMENT	0.565	7.733	0.073	-0.780	-10.667	0.073	-0.611	-9.358	0.065
INDEPENDENT VARIABLES									
AGRICULTURAL SERVICES	-0.033	-1.317	0.025	-0.610	-15.012	0.041	-0.583	-16.661	0.035
ROUTINE MANUFACTURING	-0.460	-13.163	0.035	-0.037	-1.037	0.036	-0.031	-1.016	0.030
PRODUCER	0.160	1.949	0.082	0.468	4.932	0.095	0.556	6.787	0.082
ENERGY	0.141	3.183	0.044	0.849	12.378	0.069	1.030	16.753	0.061
WAGES	0.723	6.365	0.114	0.245	2.778	0.088	0.458	6.215	0.074
FREEWAY	-0.171	-3.801	0.045	0.406	4.559	0.089	0.474	6.447	0.073
F VALUE	92.216			90.551			147.887		
PROB >	0.000			0.000			0.000		
R SQUARE	0.125			0.162			0.180		
ADJUSTED R	0.124			0.160			0.179		
EXPLAINED SUM SQUARES	1019			5824			1793		
ERROR SUM SQUARES	7152			5204			8183		

TABLE D12

LIST OF STANDARD ERROR FOR ADJACENT LABOR IN-MIGRATION NONBASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	-0.459	-4.258	0.108	-0.093	-0.711	0.131	0.339	3.072	0.110
ENDOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	0.123	9.260	0.013	0.034	2.081	0.016	-0.006	-0.466	0.014
BASIC EMPLOYMENT	0.056	2.892	0.019	0.034	2.337	0.015	0.094	7.688	0.012
INDEPENDENT VARIABLES									
PERSONAL SERVICES/RETAIL	-0.715	-5.242	0.136	0.153	1.562	0.098	0.227	2.714	0.084
GOVERNMENT	-0.086	-2.380	0.036	-0.494	-12.712	0.039	-0.331	-10.146	0.033
RETIREMENT	0.017	0.495	0.033	-0.187	-4.823	0.039	-0.124	-3.809	0.033
WAGES	0.537	4.477	0.120	0.134	1.533	0.087	0.164	2.193	0.075
F VALUE	41.904			72.928			148.330		
PROB > F	0.000			0.000			0.000		
R SQUARE	0.045			0.104			0.142		
ADJUSTED R	0.043			0.103			0.140		
EXPLAINED SUM SQUARES	154			162			337		
ERROR SUM SQUARES	3326			72			2045		

TABLE D13

LIST OF STANDARD ERROR FOR METRO < 500,000 LABOR OUT-MIGRATION MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	-0.477	-0.054	8.832	-1.190	-0.163	7.303	7.986	0.667	11.973
EMPLOYMENT VARIABLES									
BASIC EMPLOYMENT	0.151	0.390	0.387	-0.104	-1.323	0.079	-0.102	-0.943	0.108
NONBASIC EMPLOYMENT	-0.023	-0.225	0.101	0.013	0.498	0.027	0.005	0.109	0.043
ENVIRONMENTAL AMENITIES									
COLLEGE	0.022	1.144	0.019	0.005	1.156	0.005	0.002	0.127	0.017
EXPENDITURES	-0.001	-0.041	0.034	0.005	0.206	0.027	-0.027	-0.731	0.037
RECREATION	0.020	0.712	0.028	-0.003	-0.122	0.021	-0.014	-0.541	0.027
INCOME	0.418	0.288	1.450	-0.213	-0.201	1.060	1.223	0.695	1.760
ENVIRONMENTAL DISAMENITIES									
AGE DEPENDENCY	0.241	0.309	0.781	0.270	0.904	0.299	0.265	0.610	0.434
UNEMPLOYMENT	0.012	0.647	0.018	0.000	0.001	0.004	-0.002	-0.229	0.010
NONWHITE	0.105	0.784	0.134	0.052	1.056	0.049	0.122	1.454	0.084
CRIME	0.008	0.168	0.046	0.028	0.684	0.041	-0.065	-0.978	0.066
CLIMATE	0.495	1.422	0.348	0.135	1.113	0.121	0.230	1.220	0.189
HOUSING	0.153	0.442	0.346	0.110	1.122	0.098	0.055	0.377	0.147
ACCESSIBILITY									
GRAVITY	0.190	1.501	0.127	0.232	3.880	0.060	0.277	3.318	0.083
CONTIGUOUS	-2.712	-0.340	7.975	2.284	1.218	1.875	-2.549	-0.744	3.426
POPULATION	-1.022	-16.969	0.060	-1.154	-9.216	0.125	-1.218	-6.592	0.185
F-VALUE	169.006			343.616			152.297		
PROB >	0.000			0.000			0.000		
R SQUARE	0.533			0.699			0.507		
ADJUSTED R	0.530			0.697			0.503		
EXPLAINED SUM SQUARES	1591			1676			1598		
ERROR SUM SQUARES	1395			723			1556		

LIST D14

LIST OF STANDARD ERROR FOR METRO < 500,000 LABOR OUT-MIGRATION BASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	3.739	63.303	0.059	3.765	5.604	0.672	5.883	11.075	0.531
ENDOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	0.102	12.179	0.008	0.627	6.654	0.094	0.557	7.052	0.079
NONBASIC EMPLOYMENT	0.021	1.621	0.013	-0.509	-19.720	0.026	-0.590	-29.669	0.020
INDEPENDENT VARIABLES									
AGRICULTURAL SERVICES	0.215	20.450	0.011	0.175	2.392	0.073	0.220	3.501	0.063
ROUTINE MANUFACTURING	0.691	19.183	0.036	1.320	7.600	0.174	1.510	10.490	0.144
NON-ROUTINE MANUFACTURING	-0.091	-9.317	0.010	-0.201	-3.441	0.058	-0.234	-4.667	0.050
PRODUCER	1.017	29.820	0.034	1.205	6.625	0.182	1.414	8.963	0.158
ENERGY	0.434	17.515	0.025	0.788	5.085	0.155	0.928	7.213	0.129
WAGES	-2.090	-27.266	0.077	-3.358	-8.764	0.383	-3.724	-11.356	0.328
FREEWAY	-0.276	-28.821	0.010	-0.121	-1.586	0.076	-0.140	-2.184	0.064
F VALUE	551.154			181.433			297.131		
PROB >	0.000			0.000			0.000		
R SQUARE	0.690			0.423			0.545		
ADJUSTED R	0.689			0.420			0.544		
EXPLAINED SUM SQUARES	162			3789			4421		
ERROR SUM SQUARES	73			5175			3686		

LIST D15

LIST OF STANDARD ERRORS FOR METRO < 500,000 LABOR OUT-MIGRATION NONBASIC EMPLOYMENT

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	-3.746	-19.889	0.188	5.569	2.287	2.435	7.188	4.488	1.602
ENDOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	0.090	2.881	0.031	1.501	3.040	0.494	1.007	3.298	0.305
BASIC EMPLOYMENT	1.331	38.151	0.035	-1.935	-12.252	0.158	-1.616	-20.239	0.080
INDEPENDENT VARIABLES									
PERSONAL SERVICES/RETAIL	-1.293	-3.902	0.331	-0.758	-0.321	2.363	-0.315	-0.182	1.728
GOVERNMENT	0.145	3.711	0.039	-0.150	-0.516	0.291	-0.061	-0.291	0.210
RETIREMENT	0.032	0.443	0.073	-1.719	-2.314	0.743	-1.271	-2.574	0.494
WAGES	1.266	3.637	0.348	1.683	0.632	2.663	1.149	0.593	1.937
F VALUE	292.701			147.437			296.248		
PROB > F	0.000			0.000			0.000		
R SQUARE	0.440			0.284			0.443		
ADJUSTED R	0.439			0.282			0.442		
EXPLAINED SUM SQUARES	426			8169			8341		
ERROR SUM SQUARES	542			20621			296		

LIST D16

LIST OF STANDARD ERROR FOR METRO < 500,000
LABOR IN-MIGRATION MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	1.939	2.352	0.070	0.020	3.482	-2.859	-0.820	3.487	
EMPLOYMENT VARIABLES									
BASIC EMPLOYMENT	0.726	0.026	0.089	0.159	0.558	0.002	0.004	0.523	
NONBASIC EMPLOYMENT	-4.322	0.062	-0.030	-0.208	0.143	0.007	0.056	0.123	
ENVIRONMENTAL AMENITIES									
COLLEGE	1.681	0.005	0.021	0.738	0.029	0.013	0.541	0.025	
EXPENDITURES	-2.925	0.009	-0.013	-0.537	0.024	-0.014	-0.687	0.020	
RECREATION	3.168	0.012	0.025	0.962	0.026	0.035	1.545	0.023	
INCOME	0.580	0.315	0.657	0.859	0.764	0.186	0.670	0.278	
ENVIRONMENTAL DISAMENITIES									
AGE DEPENDENCY	-2.585	0.126	0.294	0.426	0.690	0.771	1.303	0.592	
UNEMPLOYMENT	-0.313	0.004	0.011	0.378	0.030	0.011	0.425	0.026	
NONWHITE	0.709	0.024	0.151	1.169	0.129	0.124	1.121	0.111	
CRIME	0.691	0.024	-0.009	-0.170	0.054	-0.027	-0.591	0.046	
CLIMATE	-3.495	0.049	0.498	1.280	0.389	0.525	1.561	0.336	
HOUSING	-0.137	0.072	0.221	0.551	0.402	0.390	1.133	0.345	
ACCESSIBILITY									
GRAVITY	1.890	0.039	0.230	2.454	0.094	0.244	2.863	0.085	
CONTIGUOUS	1.085	0.883	-4.059	-0.690	5.882	-3.063	-0.606	5.055	
POPULATION	-15.813	0.061	-1.022	-14.249	0.072	-1.066	-17.386	0.061	
F-VALUE			104.523			151.291			
PROB >			0.000			0.000			
R SQUARE			0.413			0.505			
ADJUSTED R			0.409			0.502			
EXPLAINED SUM SQUARES			1589			1691			
ERROR SUM SQUARES			2256			1659			

LIST D17

LIST OF STANDARD ERROR FOR METRO < 500,000 LABOR IN-MIGRATION BASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	13.763	0.206	1.931	35.499	0.054	2.182	20.304	0.107	
ENDOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	-2.114	0.029	0.096	13.990	0.007	0.082	1.138	0.072	
NONBASIC EMPLOYMENT	6.361	0.101	-0.027	-2.332	0.012	-0.026	16.299	-0.002	
INDEPENDENT VARIABLES									
AGRICULTURAL SERVICES	-0.966	0.042	0.311	30.631	0.010	0.311	5.928	0.052	
ROUTINE MANUFACTURING	-9.274	0.055	1.021	28.504	0.036	0.997	-0.814	-1.225	
NON-ROUTINE MANUFACTURING	1.993	0.137	-0.132	-17.854	0.007	-0.133	2.859	-0.046	
PRODUCER	1.058	0.128	1.100	38.686	0.028	1.083	6.062	0.179	
ENERGY	1.858	0.071	0.558	24.341	0.023	0.550	5.241	0.105	
WAGES	4.747	0.173	-2.578	-36.246	0.071	-2.525	-4.232	0.597	
FREEWAY	-1.520	0.067	-0.319	-36.147	0.009	-0.308	-18.055	0.017	
F VALUE			734.482			741.782			
PROB >			0.000			0.000			
R SQUARE			0.748			0.749			
ADJUSTED R			0.747			0.748			
EXPLAINED SUM SQUARES			176			175			
ERROR SUM SQUARES			59			58			

LIST D18

LIST OF STANDARD ERROR FOR METRO < 500,000 LABOR IN-MIGRATION NONBASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	-5.158	0.165	-0.253	-1.545	0.163	-0.176	-1.090	0.162	
ENDOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	2.497	0.020	0.107	3.662	0.029	0.062	2.325	0.027	
BASIC EMPLOYMENT	3.664	0.028	1.332	38.411	0.035	1.333	38.641	0.034	
INDEPENDENT VARIABLES									
PERSONAL SERVICES/RETAIL	3.629	0.104	-1.533	-4.469	0.343	-1.578	-4.461	0.354	
GOVERNMENT	-3.371	0.054	0.118	2.930	0.040	0.118	2.836	0.042	
RETIREMENT	0.009	0.050	0.019	0.272	0.069	0.117	1.769	0.066	
WAGES	-4.464	0.097	1.533	4.287	0.357	1.508	4.096	0.368	
F VALUE			293.670			294.296			
PROB > F			0.000			0.000			
R SQUARE			0.441			0.441			
ADJUSTED R			0.439			0.440			
EXPLAINED SUM SQUARES			427			426			
ERROR SUM SQUARES			542			294			

LIST D19

LIST OF STANDARD ERROR FOR METRO > 500,000
LABOR OUT-MIGRATION MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	-33.015	-4.423	7.464	-20.187	-1.867	10.812	-4.731	-0.341	13.873
EMPLOYMENT VARIABLES									
BASIC EMPLOYMENT	-0.046	-1.100	0.042	-0.118	-0.728	0.162	-0.478	-3.061	0.156
NONBASIC EMPLOYMENT	-0.014	-0.341	0.041	-0.034	-1.050	0.033	-0.056	-1.459	0.039
ENVIRONMENTAL AMENITIES									
COLLEGE	-0.026	-2.020	0.013	-0.022	-1.852	0.012	-0.016	-0.926	0.017
EXPENDITURES	0.025	0.964	0.026	-0.050	-1.859	0.027	-0.059	-1.775	0.033
RECREATION	0.130	2.855	0.046	0.185	3.958	0.047	0.190	3.356	0.057
INCOME	-4.779	-4.688	1.019	-2.695	-1.998	1.349	-0.883	-0.474	1.863
ENVIRONMENTAL DISAMENITIES									
AGE DEPENDENCY	-1.180	-4.318	0.273	-0.840	-1.769	0.475	0.191	0.504	0.380
UNEMPLOYMENT	-0.008	-1.509	0.006	-0.005	-0.815	0.006	0.006	0.904	0.007
NONWHITE	0.119	2.732	0.043	0.053	0.947	0.056	-0.006	-0.129	0.044
CRIME	0.015	0.375	0.039	0.004	0.120	0.036	-0.089	-2.317	0.039
CLIMATE	-0.172	-1.472	0.117	0.026	0.195	0.135	-0.030	-0.193	0.155
HOUSING	-0.341	-1.748	0.195	-0.074	-0.382	0.194	0.058	0.259	0.224
ACCESSIBILITY									
GRAVITY	0.252	6.690	0.038	0.276	2.625	0.105	0.563	4.669	0.121
CONTIGUOUS	1.908	0.913	2.090	4.742	2.176	2.179	3.478	1.301	2.673
POPULATION	-0.902	-17.893	0.050	-1.033	-3.085	0.335	-1.800	-5.654	0.318
F-VALUE	316.210			196.831			128.458		
PROB >	0.000			0.000			0.000		
R SQUARE	0.659			0.546			0.439		
ADJUSTED R	0.657			0.543			0.436		
EXPLAINED SUM SQUARES	2117			2380			2130		
ERROR SUM SQUARES	1097			1983			2719		

LIST D20

LIST OF STANDARD ERROR FOR METRO > 500,000 LABOR OUT-MIGRATION BASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	5.960	24.402	0.244	5.996	4.263	1.406	9.113	6.640	1.372
EXOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	0.356	12.967	0.027	0.917	5.334	0.172	1.084	5.973	0.181
NONBASIC EMPLOYMENT	0.312	13.525	0.023	-0.209	-3.645	0.057	-0.211	-3.652	0.058
INDEPENDENT VARIABLES									
AGRICULTURAL SERVICES	0.285	6.488	0.044	0.281	2.327	0.121	0.226	2.035	0.111
ROUTINE MANUFACTURING	-0.477	-7.147	0.067	0.249	1.556	0.160	0.228	1.586	0.143
NON-ROUTINE MANUFACTURING	0.369	21.127	0.017	0.001	0.016	0.043	0.025	0.638	0.039
PRODUCER	1.423	24.266	0.059	0.052	0.357	0.144	0.132	1.027	0.128
ENERGY	0.571	9.928	0.057	0.110	0.779	0.141	0.179	1.374	0.130
WAGES	-2.021	-19.185	0.105	-0.763	-3.002	0.254	-0.901	-3.952	0.228
FREEWAY	-0.043	-1.157	0.037	-0.202	-1.867	0.108	-0.134	-1.319	0.102
F VALUE	272.923			160.776			222.981		
PROB >	0.000			0.000			0.000		
R SQUARE	0.499			0.370			0.449		
ADJUSTED R	0.497			0.368			0.447		
EXPLAINED SUM SQUARES	1589			526			6001		
ERROR SUM SQUARES	1594			1888			7371		

LIST D21

LIST OF STANDARD ERROR FOR METRO > 500,000 LABOR OUT-MIGRATION NONBASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	-4.590	-16.632	0.276	-11.574	-11.572	1.000	-10.131	-10.157	0.997
ENDOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	-0.332	-15.274	0.022	-1.307	-9.091	0.144	-1.495	-11.685	0.128
BASIC EMPLOYMENT	0.282	16.425	0.017	-0.684	-7.389	0.093	-0.600	-8.228	0.073
INDEPENDENT VARIABLES									
PERSONAL SERVICES/RETAIL	1.586	7.998	0.198	4.506	10.214	0.441	4.273	10.651	0.401
GOVERNMENT	-1.097	-11.484	0.096	-1.413	-6.753	0.209	-1.491	-7.797	0.191
RETIREMENT	0.128	1.330	0.097	0.302	1.361	0.222	0.295	1.470	0.201
WAGES	-1.120	-5.915	0.189	-3.511	-8.159	0.430	-3.235	-8.293	0.390
F VALUE	114.711			501.189			629.685		
PROB > F	0.000			0.000			0.000		
R SQUARE	0.218			0.549			0.605		
ADJUSTED R	0.216			0.548			0.604		
EXPLAINED SUM SQUARES	526			11014			11507		
ERROR SUM SQUARES	1888			9040			7517		

LIST D22

LIST OF STANDARD ERROR FOR METRO > 500,000
LABOR IN-MIGRATION MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	0.045	0.007	6.446	1.984	0.346	5.735	1.466	0.671	2.185
EMPLOYMENT VARIABLES									
BASIC EMPLOYMENT	0.090	0.956	0.094	-0.295	-2.499	0.118	-0.218	-3.702	0.059
NONBASIC EMPLOYMENT	0.171	0.618	0.276	0.138	1.446	0.096	0.149	2.854	0.052
ENVIRONMENTAL AMENITIES									
COLLEGE	0.019	1.254	0.015	0.001	0.066	0.014	0.013	0.958	0.014
EXPENDITURES	0.019	0.541	0.035	0.105	1.650	0.063	0.052	1.578	0.033
RECREATION	0.033	0.761	0.043	-0.099	-1.323	0.075	-0.042	-1.079	0.039
INCOME	0.271	0.309	0.878	0.315	0.428	0.736	0.062	0.359	0.174
ENVIRONMENTAL DISAMENITIES									
AGE DEPENDENCY	-0.387	-0.943	0.410	-1.965	-3.015	0.652	-1.640	-4.763	0.344
UNEMPLOYMENT	-0.005	-0.365	0.014	-0.029	-1.653	0.017	-0.027	-3.136	0.009
NONWHITE	0.010	0.304	0.033	-0.068	-0.731	0.093	-0.039	-0.796	0.049
CRIME	0.091	1.265	0.072	0.236	2.794	0.084	0.189	4.525	0.042
CLIMATE	0.236	1.059	0.223	-0.125	-0.446	0.281	-0.232	-1.643	0.141
HOUSING	-0.346	-1.249	0.277	-0.711	-1.452	0.490	-0.823	-3.246	0.253
ACCESSIBILITY									
GRAVITY	0.119	1.916	0.062	0.141	1.716	0.082	0.268	5.075	0.053
CONTIGUOUS	12.106	4.056	2.985	10.019	2.246	4.461	3.851	1.375	2.801
POPULATION	-0.890	-6.224	0.143	-0.812	-7.444	0.109	-1.040	-15.302	0.068
F-VALUE	68.085			62.630			262.299		
PROB >	0.000			0.000			0.000		
R SQUARE	0.293			0.276			0.615		
ADJUSTED R	0.289			0.272			0.613		
EXPLAINED SUM SQUARES	3431			2308			2552		
ERROR SUM SQUARES	8261			6046			1596		

LIST D23

LIST OF STANDARD ERROR FOR METRO > 500,000 LABOR IN-MIGRATION BASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	2.484	12.987	0.191	3.404	22.200	0.153	3.703	24.873	0.149
EXOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	-0.079	-2.894	0.027	0.300	16.548	0.018	0.314	17.731	0.018
NONBASIC EMPLOYMENT	0.491	4.630	0.106	0.305	18.021	0.017	0.289	16.731	0.017
INDEPENDENT VARIABLES									
AGRICULTURAL SERVICES	-0.056	-1.428	0.039	0.160	5.130	0.031	0.104	3.210	0.032
ROUTINE MANUFACTURING	-0.462	-8.874	0.052	0.029	0.548	0.053	-0.126	-2.340	0.054
NON-ROUTINE MANUFACTURING	-0.046	-0.340	0.135	0.255	19.294	0.013	0.320	21.828	0.015
PRODUCER	0.148	1.224	0.121	1.024	21.311	0.048	1.229	24.097	0.051
ENERGY	0.172	2.616	0.066	0.245	5.413	0.045	0.305	6.631	0.046
WAGES	0.768	4.692	0.164	-1.878	-21.929	0.086	-2.055	-23.253	0.088
FREEWAY	-0.167	-2.768	0.060	0.105	3.953	0.027	0.087	3.154	0.027
F VALUE	41.543			255.683			280.287		
PROB >	0.000			0.000			0.000		
R SQUARE	0.132			0.483			0.506		
ADJUSTED R	0.129			0.481			0.504		
EXPLAINED SUM SQUARES	489			53			1009		
ERROR SUM SQUARES	3223			1491			987		

LIST D24

LIST OF STANDARD ERROR FOR METRO > 500,000 LABOR IN-MIGRATION NONBASIC EMPLOYMENT MODEL

	1960-65			1965-70			1970-75		
	BETA	T for Ho:	SE	BETA	T for Ho:	SE	BETA	T for Ho:	SE
CONSTANT	-0.517	-2.833	0.182	-2.318	-8.721	0.266	-1.653	-6.259	0.264
ENDOGENOUS VARIABLES									
LABOR MIGRATION FLOWS	0.107	4.268	0.025	-0.227	-11.444	0.020	-0.202	-10.540	0.019
BASIC EMPLOYMENT	0.061	2.168	0.028	0.425	17.184	0.025	0.413	17.615	0.023
INDEPENDENT VARIABLES									
PERSONAL SERVICES/RETAIL	-0.411	-2.093	0.196	0.906	4.498	0.201	0.953	4.705	0.203
GOVERNMENT	-0.129	-2.443	0.053	-0.714	-7.252	0.098	-0.770	-7.882	0.098
RETIREMENT	0.036	0.742	0.048	0.087	0.913	0.095	0.056	0.591	0.095
WAGES	0.237	1.381	0.172	-0.538	-2.798	0.192	-0.586	-3.024	0.194
F VALUE	14.537			110.442			108.170		
PROB > F	0.000			0.000			0.000		
R SQUARE	0.034			0.212			0.208		
ADJUSTED R	0.032			0.210			0.206		
EXPLAINED SUM SQUARES	53			494			484		
ERROR SUM SQUARES	1491			1841			1842		