JPL Publication 85-9

A Comparison of Metropolitan and Non-Metropolitan Employment Characteristics: Indications of the Size of Non-Metropolitan Mobile Communication Services User Classes

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ABSTRACT

This study was conducted to evaluate the similarities and differences between areas inside and outside U.S. metropolitan areas in terms of their commercial/industrial and government employment characteristics.

The comparison focuses on the levels, shares, and composition of employment in the commercial/industrial and government sectors that represent potential classes of land mobile communications users. The major findings of the analysis are as follows:

(1) Non-metropoliltan commercial/industrial user classes of land mobile communication services exist in significant numbers.

(2) The compositions of non-metropolitan and metropolitan commercial/industrial user classes of land mobile communication services closely resemble each other.

(3) Non-metropolitan areas have significant levels of the government user classes that represent potential markets for land mobile communication services.

(4) Non-metropolitan local governments have a significantly larger proportion of their employment in the primary user classes of private land mobile radio service than do metropolitan local governments.

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EXECUTIVE SUMMARY

A. PURPOSE

This study was conducted for the National Aeronautics and Space Administration's (NASA's) Office of Space Science and Applications, Communications Division to compare the size and composition of commercial/industrial business and government service sectors in non-metropolitan areas to those of metropolitan areas. This information may be useful in determining the extent to which non-metropolitan areas have similar needs as metropolitan areas for mobile communications service. (Such services can be provided to non-metropolitan areas by land mobile satellite systems.) Industrial suppliers of land mobile equipment and services may also find this information helpful in identifying potential markets for land mobile communication systems.

B. APPROACH

The comparison required three steps. First, commercial/industrial and government employment data from the U.S. Bureau of the Census (hereafter referred to as "Census") for metropolitan and non-metropolitan areas were compiled. Second, Federal Communications Commission (FCC) definitions of commercial/industrial and government activities eligible to obtain licenses for using radio communication systems in the private land mobile radio service frequencies were used to identify and aggregate Census data into representative categories (i.e., "user classes") of potential users of land mobile communication services. The FCC categories of activities eligible for licensing and operating private land mobile radio systems were used solely as a frame of reference for aggregating Census data into categories (referred to throughout the study as "user classes") more appropriate to the discussion of mobile communication services users. The findings of this study are relevant to the entire range of land mobile communication applications such as mobile telephone, mobile dispatch, and mobile data services. Finally, the composition and characteristics of these "user classes" in metropolitan and non-metropolitan areas were compared.

1. Data-Base Description and Limitations

National-level data provided the primary basis for comparing metropolitan and non-metropolitan areas. Data from nine selected states were also evaluated to indicate the range of metropolitan/non-metropolitan characteristics at the state level (see Figure 1). These nine states were chosen to represent regional differences and the range of extremes between densely populated industrial states and low-population-density, predominantly rural states.

The U.S. Bureau of the Census characterizes the data as being useful for analyzing both the industrial structure of regions and market potentials (Reference 1).

In general, the data used in the analysis <u>understate</u> the level of non-metropolitan activity. Activities that are partially covered or not

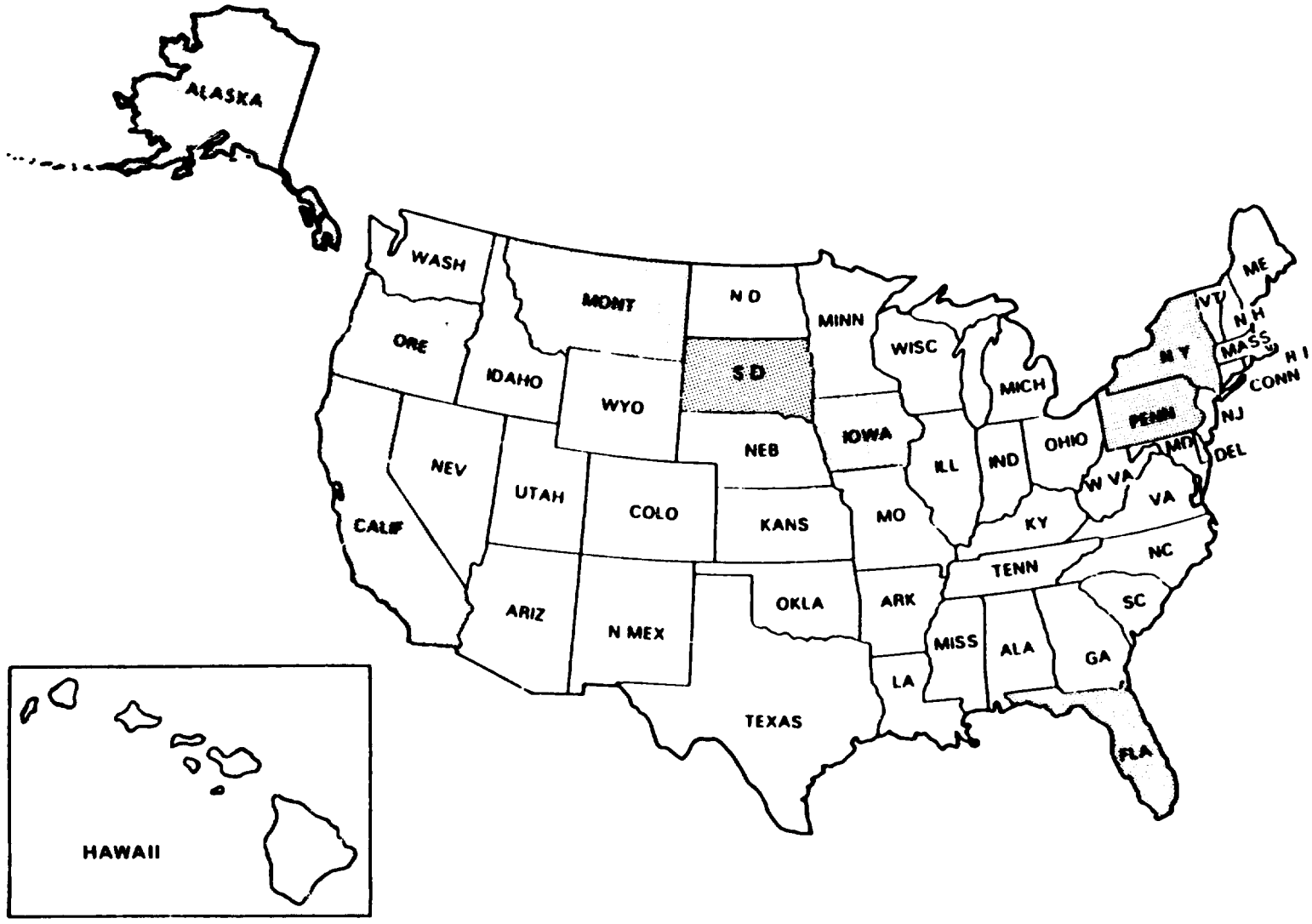

Figure 1. States Selected for Individual Analysis

addressed, but which still contribute to the size of non-metropolitan user classes of land mobile satellite services include federal and state government activities, farming, ranching, pleasure boating and barges within the coastal 200-mile limit, Great Lakes and river barge traffic, aircraft, self-employed individuals, geographically dispersed activities with central offices located in metropolitan areas, and personal (i.e., non-business/non-government) applications. While some of these activities represent significant potential markets for land mobile satellite systems, their non-inclusion in this study does not change the essence of the findings summarized below.

C. SUMMARY OF MAJOR FINDINGS

1. Commercial/Industrial User Classes

(1) Non-metropolitan commercial/industrial user classes of land mobile communication services exist in significant numbers.

(a) In 1981, 19.7% of the nation's commercial/industrial activity (representing 14.7 million workers) was located in non-metropolitan areas.

(b) In states such as Alaska, Iowa, Montana, and South Dakota (i.e., states with large proportions of their populations residing in non-metropolitan areas), non-metropolitan areas comprise between 44 and 90% of total state commercial/industrial employment.

(c) In states such as California, Florida, New York, and Pennsylvania (i.e., states with small proportions of their populations residing outside metropolitan areas), non-metropolitan areas in each state have between 300,000 and 600,000 people working in the commercial/industrial sectors of the economy.

(2) The compositions of non-metropolitan and metropolitan commercial/industrial user classes of land mobile communications closely resemble each other.

(a) The individual proportion of non-metropolitan employment in the "Construction," "Manufacturing," "Transportation, Communications, and Utilities," "Wholesale Trade," "Retail Trade," and "Services" sectors varies less than 30% from the proportion of metropolitan employment in the same sectors. These five sectors contain 89.6 and 90.4% of non-metropolitan and metropolitan employment, respectively.

2. Local Government User Classes

(1) Even though distinct differences exist between non-metropolitan and metropolitan local governments, non-metropolitan areas still have significant levels of the government user

classes that represent potential markets for land mobile communication services.

(a) In 1977, non-metropolitan areas contained 26.8% of local government activity nationwide. This percentage represents a local government employment level in excess of two million workers.[1]

(b) Non-metropolitan areas have between 15.1 and 38.9% of their total local government employment in sectors that represent the primary categories of activities eligible[2] for private land mobile radio services (i.e., the FCC sub-categories of "Public Safety - Police, Fire, Highway Maintenance, and Forestry Conservation," "Special Emergency - Medical Services, School Buses, and Beach Patrol," and "Industrial - Power, Petroleum, and Special Industrial").

(c) In Alaska, Iowa, Montana, and South Dakota (i.e., states with large non-metropolitan populations), non-metropolitan areas contain between 56.6 and 87.4% of total state local government employment.

(d) California and New York (i.e., states with the vast majority of their population living in metropolitan areas) have high levels of non-metropolitan local government activity: These two states have almost 70,000 and over 80,000 non-metropolitan local government employees, respectively.

(2) Non-metropolitan local governments have a larger proportion of their employment in the primary sub-categories of private land mobile radio than do metropolitan local governments.

(a) Sixty-three percent of non-metropolitan and 55% of metropolitan non-education local government employment nationwide exist in sectors representative of the user-specific government user classes of private land mobile radio.[3]

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[1]The 1977 version of the Census of Governments was the most recent and available local government census for the analysis that provided full coverage of the U.S.

[2]"Eligible" here refers to the FCC definitions of commercial/industrial and government activities that can obtain licenses for using radio communication systems in the private land mobile radio service frequencies.

[3]The user-specific FCC sub-categories relevant to government user classes include "Public Safety - Police, Fire, Highway Maintenance, and Forestry Conservation," Special Emergency - Medical Services, School Buses, and Beach Patrol," and "Industrial - Power, Petroleum, and Special Industrial."

SECTION I

INTRODUCTION

A. PURPOSE

This study was conducted for the National Aeronautics and Space Administration's (NASA's) Office of Space Science and Applications, Communications Division to compare the size and composition of commercial/industrial business and government service sectors in non-metropolitan areas to those of metropolitan areas. This information may be useful in determining the extent to which non-metropolitan areas have similar needs as metropolitan areas for mobile communication services. (Such services can be provided to non-metropolitan areas by land mobile satellite systems.) Industrial suppliers of land mobile equipment and services also may find this information helpful in identifying potential markets for land mobile communication systems.

B. APPROACH

1. Focus on National- and State-Level Data

Both national- and state-level data were used in the analysis. National data provided the primary basis for comparing metropolitan and non-metropolitan areas. Data from nine selected states were used to indicate the range of metropolitan and non-metropolitan characteristics at the state level. The nine states selected (Alaska, California, Florida, Iowa, Montana, New York, Oregon, Pennsylvania, and South Dakota) were chosen to represent regional differences and the range of extremes between densely populated, industrial states and low-population-density, predominantly rural states (see Figure 1-1).

2. Analytical Method

The analysis was conducted in three steps. First, commercial/industrial business and government service employment data for Standard Metropolitan Statistical Areas (SMSAs) and non-SMSAs were compiled from publications of the Department of Commerce's Bureau of the Census (hereafter referred to as the Census).[1] Level-of-employment data instead of

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[1] In 1983, the number and delineation of SMSAs in the U.S. were changed and renamed Metropolitan Statistical Areas (MSAs) by the U.S. Office of Management and Budget. Because these changes did not occur in time to be incorporated into the Bureau of the Census' planning for the 1981 census of County Business Patterns or the 1977 censuses of Local Government Employment (i.e., the most recent and available censuses relevant to this study), the SMSA designations were used. Therefore, this study's analysis and results are based on SMSA and non-SMSA distinctions. The differences in the definitions of SMSAs and MSAs are minor and do not affect the results of this study (Reference 2).

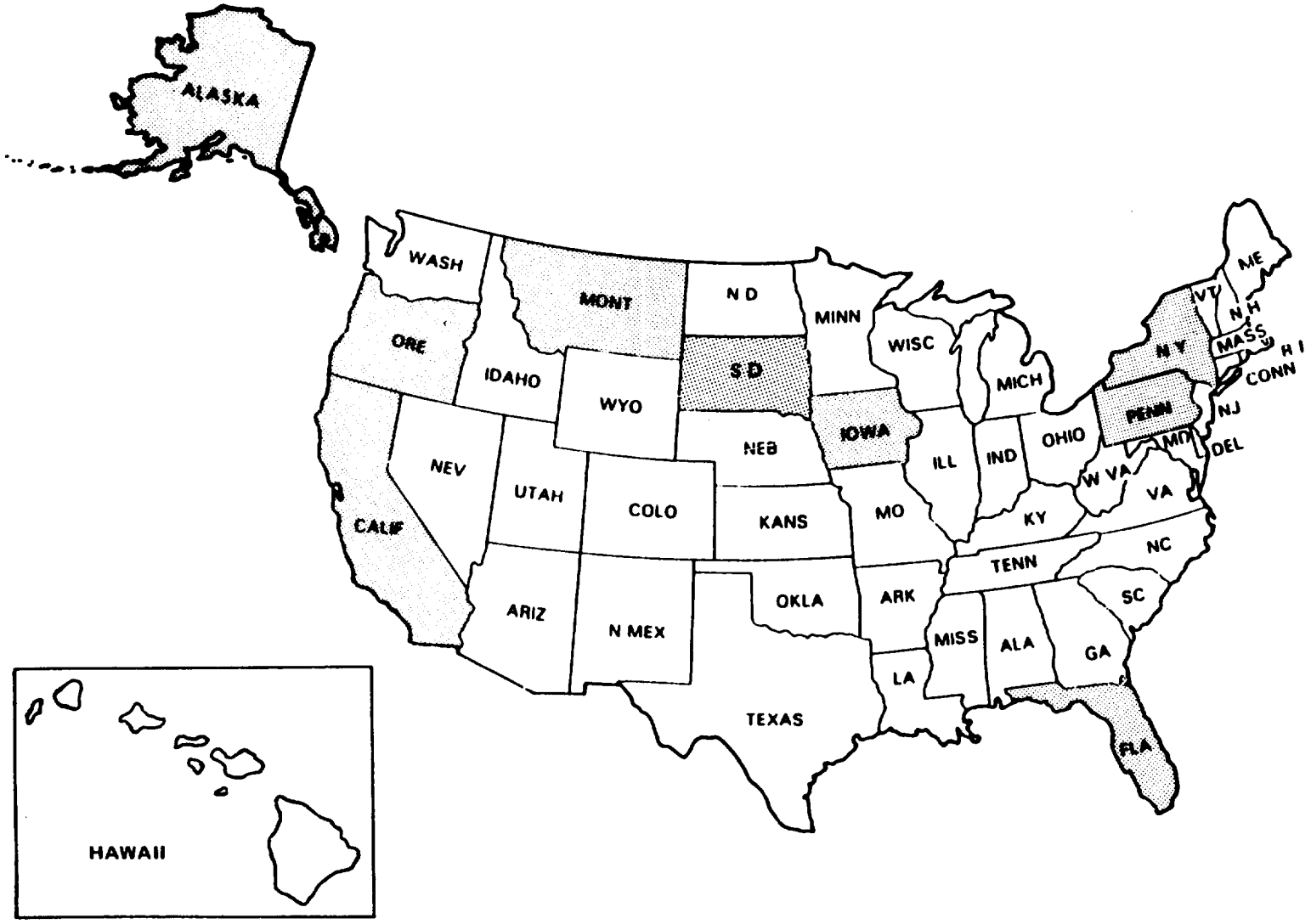

Figure 1-1. States Selected for Individual Analysis

number-of-establishments data were used because the former provides a more accurate indicator of actual activity than the latter. The Census data were examined to define those areas where actual business and government activity levels were not fully represented.

Second, Federal Communications Commission (FCC) definitions of commercial/industrial and government activities eligible to obtain licenses for using radio communication systems in the private land mobile radio service frequencies were used to identify and guide aggregations of Census data into representative categories (i.e., user classes) of potential land mobile communication services users.[2] Appendix B describes in detail the cross-correlation of FCC and Census categories.

Third, SMSA and non-SMSA levels, shares, and composition of commercial/industrial and local government employment in the categories representing land mobile communication services user classes were compared. The calculations and the use of their results are as follows:

(1) SMSA and non-SMSA employment levels -- provides a basis for comparing the absolute levels of SMSA and non-SMSA user classes.

(2) SMSA and non-SMSA employment as percentages of total employment -- provides a basis for comparing the relative size of land mobile communication services user classes in SMSA and non-SMSA areas.

(3) Proportion of total employment contained in each employment category for SMSA and non-SMSA areas -- provides a basis for comparing the composition of SMSA and non-SMSA user classes.

(4) Coefficients of correlation between SMSA and non-SMSA employment mixes -- indicates the degree of similarity between SMSA and non-SMSA user class mixes.

The entire analysis was based on population data from the Department of Commerce, Bureau of the Census. No projections or estimates of commercial/industrial or governmental activity levels were used. Two statistical techniques were used: the correlation analysis mentioned in item (4) above and a statistical analysis of variance test for identifying business and government sectors at the state level with similar or dissimilar relative levels of SMSA and non-SMSA employment. These techniques were used for simplifying the presentation of state-level data and for providing supporting evidence of apparent SMSA/non-SMSA similarities and differences. Even though the entire analysis was based on population as opposed to sample data, neither of the two statistical techniques was used as the primary basis for the study's conclusions.

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[2]The FCC categories of activities eligible for licensing and operating private land mobile radio systems were used solely as a frame of reference for aggregating Census data into categories (referred to throughout the study as "user classes") more appropriate to the discussion of mobile communication services users. The findings of this study are relevant to the entire range of land mobile communication applications such as mobile telephone, mobile dispatch, and mobile data services.

C. ORGANIZATION OF THE REMAINDER OF THIS REPORT

The remainder of this report is organized into three sections that present the major results of the study, and seven appendixes, which provide the detailed analysis and backup information supporting the study's findings. Section II describes the Census data bases that were used in the analysis and their limitations and summarizes the cross-correlation of FCC and Census activity classification categories. Sections III and IV outline the major results of the comparison of SMSA and non-SMSA land mobile communication services user classes involved in commercial/industrial and governmental activity, respectively. Appendix A provides a definition of SMSAs. Appendix B details the cross-correlation and analysis of FCC and Census activity classification categories. Appendixes C through F present the in-depth comparison and analysis at the individual state level of SMSA versus non-SMSA user classes of land mobile communications involved in commercial/industrial and governmental activities. Appendix G contains a copy of the Census Bureau's review comments on the draft version of this document.

SECTION II

DATA-BASE DESCRIPTION

A. DATA-BASE DESCRIPTION AND LIMITATIONS

The analysis presented in this report was based on data from the most recently published editions and unpublished aggregates of two major U.S. Department of Commerce, Bureau of the Census data bases: the 1981 edition of County Business Patterns and the 1977 edition of Census of Governments.[3] Together, these two data bases broadly represent the activities currently eligible for private land mobile radio service.

1. Industrial/Commercial Employment Statistics - County Business Patterns

a. General Description. The 1981 edition of County Business Patterns was used as the source for state statistics on industrial/commercial employment. (The Economics Surveys Division of the Bureau of the Census provided unpublished SMSA and non-SMSA national aggregates of published state data.) County Business Patterns presents employment statistics by county and industry for each state. Industrial/commercial employment is broken down into major economic divisions of the economy using 11 categories (see Table 2-1).

Table 2-1. Major Economic Divisions of Industrial/Commercial Employment, 1981[a]

Agricultural Services, Forestry, Fisheries
Mining
Contract Construction
Manufacturing
Transportation and Other Public Utilities
Wholesale Trade
Retail Trade
Finance, Insurance, and Real Estate
Services
Nonclassifiable Establishments

[a]County Business Patterns, 1981, U.S. Department of Commerce, Bureau of the Census.

[3]The 1977 version of the Census of Governments is the most recent local-government census available that provides full coverage of the United States. Moreover, the Bureau of the Census, in their review of this study,
(Continued p. 2-2.)

The data are taken from (1) the employment and payroll information contained in Internal Revenue Service Form 941 (a quarterly federal tax return that each legal entity having paid employees must file) and (2) the Bureau of the Census Annual Company Organization Survey (Reference 1). The Bureau of the Census characterizes these data as being:

> "... useful for analyzing market potential, measuring the effectiveness of sales and advertising programs, setting sales quotas and budgets, analyzing the industrial structure of regions, making basic economic studies of small areas, and serving other business uses. They are also useful to government agencies for administration and planning purposes." (Reference 1)

b. Limitations. Because this data base only covers establishments with more than one employee, self-employed individuals are not included; this incompleteness of the data base does not impact the results of the analysis inasmuch as self-employed individuals constitute approximately only 9% of the total national workforce (Reference 3). Also, this data base does not cover railroads, farms, or ranches.

A more relevant limitation of the County Business Patterns data base is that the location of establishments engaged in geographically dispersed activities is represented by central administrative offices and auxiliary establishments.

> "For activities such as construction, transportation [includes long haul trucking], communications, electric, gas, sanitary services, dispersed sales activities, and similar physically dispersed operations, establishments are represented by those relatively permanent main or branch offices, terminals, stations, etc., which are either (1) directly responsible for supervising such activities or (2) the base from which personnel operate to carry out these activities" (Reference 1, p. vi).

Therefore, the potential industrial/commercial non-metropolitan land mobile satellite communications market (represented here by non-SMSA activities) is understated because SMSA-based activities that occur within non-SMSA areas (and intra-SMSA rural areas) are not classified as non-SMSA activities.

2. Government Employment Statistics - Census of Governments

a. General Description. The 1977 Census of Governments was used as the source for national and state statistics on governmental employment. The Census has three major categories of government: federal, state, and local government. Local governments include counties, municipalities, townships,

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has stated that (1) "... since the 1977 Census, there has been no appreciable change in the mix of employment types or shifts from urban to rural [areas] or vice versa" and (2) that the findings of the Census' Govenment Division "parallel" those of this study (Reference 2, Appendix G).

school districts, and special districts. As shown in the first column of Table 2-2, there are eight major divisions of government employment. To highlight potential mobile communications government markets, the analysis used selected aggregations of detailed employment statistics (see column 2 of Table 2-2). The data were collected as part of the regular five-year Census of Governments. Pertinent to this report's comparison of SMSA and non-SMSA areas, the Bureau of the Census notes that for government functions:

> "... the data for "county areas" and State-level aggregates probably represent the most uniform bases for comparing one geographic area to another." (Reference 4, p. 6)

b. Limitations. Because SMSA versus non-SMSA breakdowns of state and federal employment are unavailable, the level of non-SMSA and SMSA activity cannot be fully quantified. Neither state nor federal government employment data are reported in the census at a level lower than state aggregates. While major employment divisions of state employment (e.g., education, public safety, etc.) are reported, the federal statistics are presented either as national aggregates for "selected" employment divisions or as state aggregates of total federal employment.

The lack of detail for federal employment is due to national security reasons -- mainly to obscure the location and numbers of people employed by the Central Intelligence Agency, the National Security Agency, and the Federal Bureau of Investigation (Reference 1, p. vii). Because the detailed location component of the federal and state governments data is missing, the potential non-metropolitan government land mobile satellite communications market (represented here by non-SMSA activities) is understated. The degree of understatement may be significant because many state and federal activities are characteristically dispersed. Federal agencies such as the FBI, Immigration and Naturalization, the National Security Agency, and the Drug Enforcement Administration frequently engage in activities outside of SMSAs. Similarly, state government activities encompass a wide range of substantially non-SMSA activities such as forest fire prevention and control, flood control, irrigation, forestry, mineral resource activities, and highway maintenance and construction.

3. Other Limitations of the Selected Data Bases

This study analyzes only those business and local government activites that are covered by the available data bases. Exemplary activities that are not covered (besides those mentioned above), but which still represent potential users of land mobile satellite service include pleasure boating and barges within the coastal 200-mile limit, Great Lakes and river barge traffic, aircraft, and personal use (i.e., non-business/non-government) applications. Some of these user classes may be sizable. For example, as shown in Table 2-3, there are over nine million pleasure boats in the United States; of these, it is estimated that 120,000 are fully licensed to sail in international waters (Reference 5).

Table 2-2. Major Divisions and Selected Aggregations of Governmental Employment

Census Categories and Selected Aggregations of Sub-Categories[a]	Category Titles Used in the Analysis
Education Services	Education
Social Services and Income Maintenance	
• Hospitals + Health	Hospitals and Health
• Public Welfare + Social Insurance Administration	Income Maintenance
Transportation	
• Highways	Highways
• Air Transportation + Water Transportation	Other Transportation
Public Safety	
• Police Protection + Fire Protection	Police and Fire Protection
• Correction	Correction
Environment and Housing	
• Natural Resources + Local Parks and Recreation	Environment
• Housing and Urban Renewal + Sewerage + Sanitation Other than Sewerage	Housing and Urban Renewal
Government Administration	Government Administration
Local Utilities	
• Water Supply + Electric Power + Gas Supply	Local Utilities
• Transit	Transit
Other	Other

[a]Source: 1977 Census of Governments - Compendium of Government Employment, U.S. Department of Commerce, Bureau of the Census.

Also, because the Census data provides a one-point-in-time numeration of employment, this study does not address the seasonal variations of non-SMSA business/government user class requirements resulting from the movement of local populations (e.g., migrant farm workers, national park and forest visitors, forest fire fighters).

B. CROSS-CORRELATION OF FCC AND CENSUS CATEGORIES

As mentioned in Section I, the FCC user classification definitions of activities eligible for private land mobile radio service regulation were used to guide aggregations of the Census categories into representative user classes of land mobile communication services. The results of the cross-correlation are summarized here. Appendix B presents the complete cross-correlation and a detailed analysis of the similarities and differences between the two types of classification systems.

As shown in the first column of Table 2-4, the FCC defines four major classifications of private land mobile radio service (i.e., Public Safety, Special Emergency, Industrial, and Land Transportation), each of which contains a number of sub-categories. As shown in the second column of Table 2-4, the FCC sub-categories encompass almost all of the Census commercial, industrial, and governmental categories shown in Tables 2-1 and 2-2. Because the FCC focuses on the application purpose of private land mobile radio in defining user categories as opposed to the Census' emphasis on types of economic/government activity, a one-to-one correspondence does not exist between the FCC and Census categories. In a number of cases, more than one FCC sub-category represents the same Census category. However, the Census categories are sufficient for distinguishing between the various eligible categories of private land mobile radio service.

Table 2-3. Pleasure Boats in the United States[a]

State	Number of Boats Registered
United States	9,165,094
California	605,387
Florida	526,495
New York	327,700

[a]Source: Department of Transportation, Boating Statistics, 1983, U. S. Coast Guard, June 1984.

Table 2-4. FCC Private Land Mobile Radio Service Categories and Sub-Categories and Representative Census Standard Industrial Classification (SIC) Categories and Sub-Categories[a]

FCC Private Land Mobile Radio Service Categories and Sub-Categories	Representative Census Categories and Sub-Categories
Public Safety:	
• Local Government	• Income Maintenance (G) • Hospitals & Health (G) • Highways (G) • Other Transportation (G) • Police and Fire Protection (G) • Correction (G) • Environment (G) • Housing and Urban Renewal (G) • Government Administration (G) • Local Utilities (G) - Transit (G) • Other (G)
• Police • Fire	• Police and Fire Protection (G)
• Highway Maintenance	• Highways (G)
• Forestry-Conservation	• Environment (G)
Special Emergency:	
• Medical Services	• Hospitals & Health (G) • Fire Protection (G) • Services (C/I)
• Rescue Organizations	• Services (C/I)
• Physically Handicapped	N/A
• Veterinarians	• Agricultural Services (C/I) • Services (C/I)

G = Census Government Employment Category.
C/I = Census Commercial/Industrial Employment Category.
N/A = Not addressed in this study.

[a]Source: See Tables 2-2 and B-1.

Table 2-4. FCC Private Land Mobile Radio Service Categories and Sub-Categories and Representative Census Standard Industrial Classification (SIC) Categories and Sub-Categories (Cont'd)

FCC Private Land Mobile Radio Service Categories and Sub-Categories	Representative Census Categories and Sub-Categories
Special Emergency (Cont'd):	
• Disaster Relief Organizations	• Services (C/I)
• School Buses	• Education Services (G) • Transportation, Communications, and Utilities (C/I)
• Beach Patrols	• Environment (G)
• Establishment in Isolated Areas	N/A
• Communication Standby Facilities	• Transportation, Communications, and Utilities (C/I)
• Emergency Repair of Public Communications	• Transportation, Communications, and Utilities (C/I)
Industrial:	
• Power	• Local Utilities (G) • Transportation, Communication, and Utilities (C/I)
• Petroleum	• Environment (G) • Mining (C/I) • Manufacturing (C/I) • Transportation, Communications, and Utilities (C/I)
• Motion Picture	• Services (C/I)
• Relay Press	• Manufacturing (C/I) • Services (C/I)

G = Census Government Employment Category.
C/I = Census Commercial/Industrial Employment Category.
N/A = Not addressed in this study.

Table 2-4. FCC Private Land Mobile Radio Service Categories and Sub-Categories and Representative Census Standard Industrial Classification (SIC) Categories and Sub-Categories (Cont'd)

FCC Private Land Mobile Radio Service Categories and Sub-Categories	Representative Census Categories and Sub-Categories
Industrial (Cont'd):	
• Special Industrial	• Local Utilities (G) • Agricultural Services (C/I) • Mining (C/I) • Contract Construction (C/I) • Manufacturing (C/I) • Transportation, Communications, and Utilities (C/I) • Wholesale Trade (C/I) • Retail Trade (C/I)
• Business	• Wholesale Trade (C/I) • Retail Trade (C/I) • Finance, Insurance, and Real Estate (C/I) • Services (C/I)
• Manufacturing	• Manufacturing (C/I)
• Telephone Maintenance	• Transportation, Communications, and Utilities (C/I)
Land Transportation:	
• Motor Carrier	• Transportation, Communications, and Utilities (C/I)
• Railroad	N/A
• Taxicab	• Transportation, Communications, and Utilities (C/I)
• Automobile Emergency	• Retail Trade (C/I) • Services (C/I)

G = Census Government Employment Category.
C/I = Census Commercial/Industrial Employment Category.
N/A = Not addressed in this study.

SECTION III

ANALYSIS OF SMSA VERSUS NON-SMSA COMMERCIAL/INDUSTRIAL ACTIVITY

As discussed in Section I, SMSA and non-SMSA commercial/industrial activity and characteristics (as measured by Census employment statistics) were compared across ten major sectors of the economy. For the country as a whole and individually for a sample of nine selected states, three types of comparisons were made: (1) levels of employment, (2) sector shares of employment, and (3) mixes of employment. The results of the analysis, as discussed below, demonstrate that potential non-SMSA user classes of commercial/industrial land mobile communication services exist in significant numbers and in substantially the same proportions and combinations as SMSA user classes.

A. COMMERCIAL/INDUSTRIAL EMPLOYMENT LEVELS

The Census data confirm that non-SMSA areas have significant levels of the commercial/industrial user classes that represent potential markets for land mobile communication services. Specifically, as of 1981, 19.7% of the nation's commercial/industrial activity was located outside SMSAs (see Table 3-1). Over 4.7 million people were employed by manufacturing firms located outside SMSAs. Additionally, in excess of 8.5 million people were employed by firms located in non-SMSA areas and involved in transportation, communications, utilities, wholesale trade, retail trade, finance, insurance, real estate, and services.

While the proportion of non-SMSA commercial/industrial activity nationwide approaches 20%, the actual proportions for individual states vary widely. For example, in Alaska, Iowa, Montana, and South Dakota (i.e., states with large proportions of their population in non-SMSA areas), non-SMSA areas comprise between 44.2 and 90% of commercial/industrial employment; on the other hand, the non-SMSA shares of California, Florida, New York, and Pennsylvania range between 4.4 and 14.3%. While the relative proportions in the latter four states seem small, the actual number of non-SMSA workers in these states approaches or exceeds the number of non-SMSA workers in the states that have higher proportionate levels of non-SMSA employment (see Table 3-2). In other words, the data indicate that individual states either have large proportions or large absolute numbers of potential non-SMSA commercial/industrial users of land mobile communication services.

B. SHARES OF COMMERCIAL/INDUSTRIAL EMPLOYMENT

Nationwide, non-SMSAs have potential commercial/industrial users of land mobile communication services in each of the major sectors of the economy. As shown in Table 3-1, the non-SMSA share of total national commercial/industrial employment in the various categories ranges from 12.8% for "Finance, Insurance, and Real Estate" to 59.1% for "Mining." While "Mining" is the only sector of the economy where non-SMSA areas have the majority of employment, "Agricultural Services, Forestry, Fisheries," "Mining," "Manufacturing,"

Table 3-1. SMSA Versus Non-SMSA Commercial/Industrial Employment, United States, 1981[a]

Industry	Total	Non-SMSA		SMSA	
		Number	%	Number	%
Total	74,850,402	14,743,435	19.7	60,106,967	80.3
Agricultural Services, Forestry, Fisheries	302,694	92,309	30.5	210,385	69.5
Mining	1,107,726	654,481	59.1	453,245	40.9
Contract Construction	4,286,069	829,132	19.3	3,456,937	80.7
Manufacturing	20,428,330	4,793,239	23.5	15,635,091	76.5
Transportation, Communications and Utilities	4,613,030	767,561	16.6	3,845,469	83.4
Wholesale Trade	5,260,928	856,755	16.3	4,404,173	83.7
Retail Trade	15,390,998	3,517,154	22.9	11,873,844	77.1
Finance, Insurance, and Real Estate	5,409,780	689,921	12.8	4,719,859	87.2
Services	17,814,081	2,748,068	15.4	15,066,013	84.6
Nonclassifiable Establishments	587,766	145,815	24.8	441,951	75.2

[a]Source: Unpublished national aggregates of 1981 County Business Patterns data. Data furnished by U.S. Bureau of the Census, County Business Patterns Office, Telecon, February 1984.

"Retail Trade," and "Nonclassifiable Establishments" all have non-SMSA employment levels equal to at least 30% of their SMSA counterparts. The balance of sectors, "Transportation, Communications, and Utilities," "Wholesale Trade," "Finance, Insurance, and Real Estate," and "Services," individually comprise between 12.8 and 16.6% of non-SMSA employment.

Table 3-2. Non-SMSA Commercial/Industrial Employment Levels in Selected States[a]

State	Non-SMSA Employment	
	Number	Percent of Total State Commercial/ Industrial Employment
Alaska	50,570	44.2
California	365,797	4.4
Florida	303,201	9.7
Iowa	417,448	47.5
Montana	185,249	90.0
New York	488,364	8.1
Oregon	247,682	30.3
Pennsylvania	571,063	14.3
South Dakota	98,885	57.9

[a]Source: Derived from data in County Business Patterns, 1981.

C. SMSA AND NON-SMSA EMPLOYMENT MIXES

The high degree of similarity between SMSA and non-SMSA commercial/industrial activities becomes most apparent when the overall employment mixes (i.e., the relative shares of employment in the various sectors) of the two areas are compared. Both at the national and individual state level, non-SMSA employment patterns closely resemble their SMSA counterparts. As shown in Table 3-3, a high and statistically significant degree of correlation exists between SMSA and non-SMSA sector patterns of commercial/industrial employment. In terms of the FCC categories discussed in Section II, this relationship indicates that the non-SMSA and SMSA mixes of potential users of land mobile communication services closely approximate each other.

1. National-Level Comparison of Commercial/Industrial Activity Mixes

As mentioned above, at the national level the various sectors of commercial/industrial activity have closely similar representation both inside and outside SMSA areas. Figure 3-1 graphically depicts this similarity. The vertical and horizontal axes represent the respective percentages of SMSA and non-SMSA employment contained in each commercial/industrial sector. The 45-deg line highlights the points on the graph where the percentage of total non-SMSA employment in a given commercial/industrial sector equals the

Table 3-3. Coefficients of Correlation between SMSA and Non-SMSA Distributions (Mixes) of Industrial/Commercial Employment

State	Correlation Coefficient[a]
United States	0.94
Alaska	0.85
California	0.92
Florida	0.96
Iowa	0.98
Montana	0.93
New York	0.93
Oregon	0.96
Pennsylvania	0.95
South Dakota	0.97

[a] Significance Level: $\alpha < 0.01$

percentage of total SMSA employment in the same sector. Notice that the various points all cluster around the 45-deg line; this indicates the high degree of similarity between SMSA and non-SMSA areas. As discussed in sub-section III.C, "Retail Trade," "Manufacturing," and "Mining" all lie to the right of the line, indicating that at the national level non-SMSA areas are characterized by a higher relative share of employment in these sectors. Similarly, "Finance, Insurance, and Real Estate" and "Services" lie to the left of the line, indicating that SMSA areas comprise a somewhat larger relative share of these sectors than non-SMSA areas. As Figure 3-1 demonstrates, however, none of these deviations are large enough to distort the overall pattern of similarity in the composition of commercial/industrial activity in non-SMSA and SMSA areas.

2. State-Level Comparison of Commercial/Industrial Activity Mixes

The individual state patterns of commercial/industrial activity mirror the national pattern of similarity between SMSA and non-SMSA areas. Moreover, the individual state patterns verify that this "similarity" has a regional component. In other words, even though the relative share of total state commercial/industrial employment in a particular sector varies from state to state, proportionate SMSA and non-SMSA sector shares within individual states are similar.

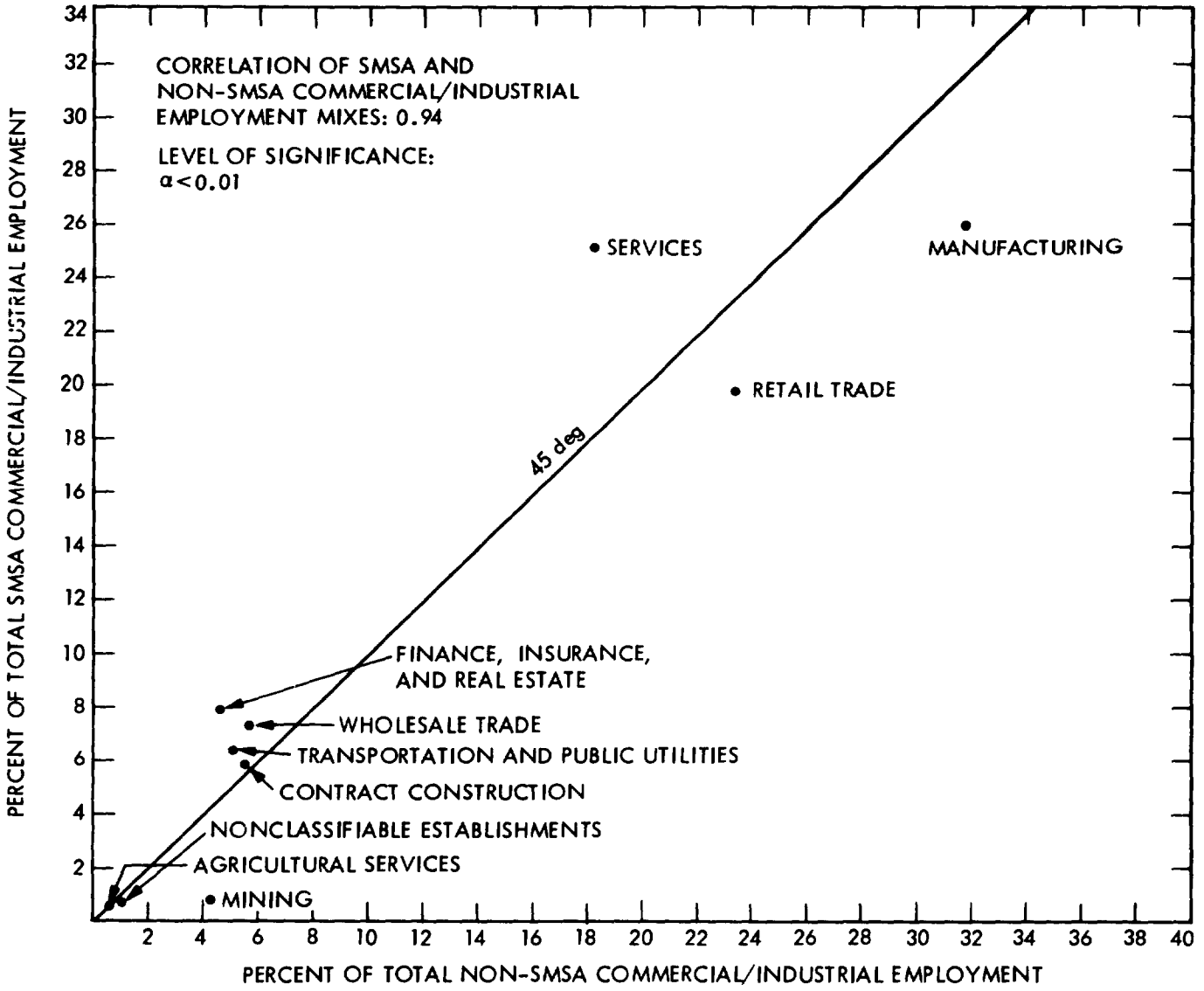

Figure 3-1. Percentage Mix of SMSA versus Non-SMSA Commercial/ Industrial Employment, United States, 1981

For example, in South Dakota "Manufacturing" employment constitutes approximately 15% of both SMSA and non-SMSA commercial/industrial activity while nationwide "Manufacturing" accounts for over 25% of commercial/industrial employment inside and outside SMSAs (see Table 3-4 and Appendix D). Similar examples of parallel SMSA/non-SMSA variations from national patterns occur for "Manufacturing" and "Contract Construction" in Florida and Montana, and for "Manufacturing," "Contract Construction," and "Transportation, Communications, and Utilities" in Alaska (see Table 3-4 and Appendix D).

In summary, the analysis indicates that the overall composition of SMSA and non-SMSA potential commercial/industrial user classes of land mobile communication services as represented by employment data closely resemble each other both nationally and at the regional level.

Table 3-4. Percentage Composition of SMSA and Non-SMSA Commercial/Industrial Employment by Sector for the United States and Selected States, 1981[a]

EMPLOYMENT SECTOR	STATE																			
	UNITED STATES		ALASKA		CALIFORNIA		FLORIDA		IOWA		MONTANA		NEW YORK		OREGON		PENNSYLVANIA		SOUTH DAKOTA	
	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA
Agricultural Services, Forestry, Fisheries	0.4	0.6	0.3	0.9	0.6	2.0	0.7	2.6	0.3	0.6	1.1	0.4	0.2	0.2	0.7	1.3	0.2	0.5	0.3	0.6
Mining	0.8	4.3	5.8	10.1	0.5	2.0	0.3	1.7	0.1	0.3	1.9	5.4	0.1	0.6	0.2	0.4	0.7	4.6	0.4	2.6
Contract Construction	5.8	5.5	10.6	9.1	5.8	6.1	9.0	10.1	4.7	4.8	9.1	5.7	3.4	3.0	5.5	4.7	4.9	3.3	6.0	4.9
Manufacturing	26.0	31.8	3.0	13.3	25.0	18.2	14.8	15.4	26.3	27.9	4.6	11.7	23.6	33.8	22.7	29.4	32.1	39.1	15.0	13.8
Transportation, Communications and Utilities	6.4	5.1	14.1	13.5	6.3	6.1	6.9	5.6	5.9	4.6	5.2	8.1	7.1	5.1	6.8	5.7	5.5	5.7	9.7	5.1
Wholesale Trade	7.3	5.7	7.7	3.5	7.0	6.1	6.8	5.2	7.5	9.7	8.7	8.2	7.9	5.2	9.0	5.3	6.3	4.6	8.4	10.9
Retail Trade	19.8	23.3	22.0	21.7	19.8	28.6	24.8	28.7	21.4	24.5	28.1	26.4	16.0	20.7	22.0	26.2	17.9	19.5	24.9	27.9
Finance, Insurance, and Real Estate	7.9	4.6	8.1	5.0	8.3	6.4	8.7	7.6	8.8	5.4	8.5	6.7	11.9	4.5	8.1	5.2	6.6	3.8	7.2	6.4
Services	25.1	18.2	26.6	20.6	25.8	22.7	26.9	21.6	24.4	21.2	27.2	26.4	29.0	26.2	24.1	20.5	25.1	18.2	27.3	26.6
Nonclassifiable Establishments	0.7	1.0	1.7	2.3	1.0	1.7	1.1	1.5	0.5	1.0	5.5	1.0	0.7	0.8	0.8	1.4	0.5	0.6	0.8	1.2

[a]Source: Derived from data in County Business Patterns, 1981.

SECTION IV

ANALYSIS OF SMSA VERSUS NON-SMSA LOCAL GOVERNMENTAL ACTIVITY

Similar to the analysis of commercial/industrial activity presented in Section III, three types of comparisons were made between SMSA and non-SMSA local government activity: (1) levels of employment, (2) proportionate shares of employment by type of activity, and (3) overall mix of employment. As detailed below, the analysis indicates that even though distinct differences exist between SMSA and non-SMSA local governments, non-SMSA areas still have significant shares of the government user classes that represent potential markets for land mobile communication services.

A. LEVELS OF LOCAL GOVERNMENT EMPLOYMENT

1. National Non-SMSA Levels of Local Government Employment

As shown in Table 4-1, non-SMSA local governments employ in excess of two million people. This represents 26.8% of local government activity nationwide. In terms of the FCC sub-categories, non-SMSA areas have significant employment levels in all local government sectors that represent the FCC's user-specific classes of private land mobile radio.[4] For example, non-SMSA areas have over 265,000 employees in the "Police and Fire Protection," "Transportation," and "Environment" sectors combined -- the employment sectors that correspond to the FCC "Public Safety" sub-categories of "Police," "Fire," "Highway Maintenance," and "Forestry Conservation" (see Table 4-1). The non-SMSA portion of the "Health and Hospitals" sector, which functionally coincides with the FCC "Special Emergency - Medical Services" sub-category, employs over 200,000 people. The Census' "Education" category (the category most pertinent to the FCC's "Special Emergency - School Buses" sub-category) composes the single largest sector in non-SMSA areas with over 1.2 million employees.

2. Levels of Government Employment in Individual States

Similar to the pattern for commercial/industrial employment, the non-SMSA proportions of local government employment for individual states vary widely from the overall national share. For example, in states with large non-SMSA populations such as Alaska, Iowa, Montana, and South Dakota, non-SMSA areas constitute between 56.6 and 87.4% of state local government employment (see Table 4-2). On the other hand, in states such as California and New York, where the vast majority of the population lives inside SMSAs, between 8 and 11% of local government employment is located in non-SMSA areas; however, in both of these states (as is the case with commercial/industrial employment) a relatively large number of people work for non-SMSA local governments -- almost 70,000 in California and over 80,000 in New York (see Table 4-2).

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[4]As discussed in Section II, the user-specific sub-categories include "Public Safety - Police, Fire, Highway Maintenance, and Forestry," "Special Emergency - Medical Services, School Buses, and Beach Patrol," and "Industrial - Power, Petroleum, and Special Industrial."

Table 4-1. SMSA Versus Non-SMSA Local Government Employment, United States, 1977[a]

Local Government Sector	Total	Non-SMSA		SMSA	
		Number	%	Number	%
Total	7,687,815	2,058,478	26.8	5,629,337	73.2
Education	4,193,884	1,231,211	29.4	2,962,673	70.6
Hospitals and Health	625,274	207,805	33.2	417,469	66.8
Income Maintenance	191,472	39,740	20.8	151,732	79.2
Highways	290,295	112,995	38.9	177,300	61.1
Other Transportation	25,891	2,411	9.3	23,480	90.7
Police and Fire Protection	710,991	127,289	17.9	583,702	82.1
Correction	82,777	12,566	15.2	70,211	84.8
Environment	184,782	27,917	15.1	156,865	84.9
Housing and Urban Renewal	290,343	48,982	16.9	241,361	83.1
Government Administration	436,084	127,200	29.2	308,884	70.8
Local Utilities	183,889	47,968	26.1	135,929	73.9
Transit	125,954	1,575	1.3	124,379	98.7
Other	346,179	70,827	20.5	275,352	79.5

[a]Source: Derived from data presented in Table 13 of Census of Governments - Compendium of Public Employment, 1977.

Table 4-2. Non-SMSA Local Government Employment Levels in Selected States, 1977[a]

State	Non-SMSA Employment	
	Number of People Employed	Percent of State's Total Local Government Employment
Alaska	7,807	56.6
California	68,453	8.0
Florida	61,655	18.6
Iowa	64,316	63.7
Montana	21,186	77.8
New York	81,575	11.3
Oregon	36,032	42.3
Pennsylvania	58,260	16.8
South Dakota	19,484	87.4

[a]Source: Table 13, Census of Governments - Compendium of Public Employment, 1977.

3. Sectors of State Government Inadequately Represented by Local Government Data

Even though local governments (which constitute 72.6% of non-federal government activity) represent a good general indicator of government activity, they do not adequately represent some state government user-specific classes of private land mobile radio. Specifically, as shown in Table 4-3, state government composes nearly 50% or more of the employment in each of five sectors: "Income Maintenance," "Correction," "Hospitals and Health," "Highways," and "Environment." The latter three coincide with three user-specific FCC sub-categories (i.e., "Special Emergency - Medical Services," "Public Safety - Highway Maintenance," and "Public Safety - Forestry Conservation") and, as discussed below, represent relatively large non-SMSA user classes of land mobile communication services.

B. SECTOR SHARES OF GOVERNMENTAL EMPLOYMENT

Non-SMSA areas contain between 15.1 and 38.9% of the total national employment in the local government sectors representative of the FCC's user-specific sub-categories. The six sectors that represent these sub-categories contain as a whole a greater share of non-SMSA employment than SMSA employment (see Table 4-4). The remaining seven sectors (representing 21.3 and 14.7% of SMSA and non-SMSA local government employment, respectively) correspond to the FCC's non-user-specific "Public Safety - Local Government" sub-category. In most of these seven sectors, the non-SMSA proportionate share of employment differs from the SMSA proportionate share of employment by more than 30% (see Table 4-4).

1. Individual Sector Comparisons of SMSA and Non-SMSA Local Government Employment

As detailed in Appendix E and indicated in Table 4-4, non-SMSAs compared nationwide to SMSAs have a greater share of their total local government employment in the "Hospitals and Health," "Highways," and "Government Administration" sectors and "Natural Resources" component of the "Environment" sector. Conversely, non-SMSAs compared to SMSAs also have a smaller share of their employment in the "Police and Fire," "Other Transportation," "Corrections," "Housing and Urban Renewal," and "Transit" sectors and the "Local Parks and Recreation" component of the "Environment" sector. Both these trends are also apparent at the individual state level (see Appendix E). In terms of the user-specific FCC categories, these findings indicate that non-SMSAs compared to SMSAs have relatively larger "Public Safety - Highway Maintenance and Forestry," "Special Emergency - Medical Services" and relatively smaller "Public Safety - Police and Fire" local government user classes of land mobile communication services.

Also, because state governments tend only to maintain roads outside incorporated municipalities (Reference 2) and have all of their "Environment" sector employment involved in "Natural Resources" (see Tables E-3 and E-4 in Appendix E), it is likely that the non-SMSA "Public Safety - Highways and

Table 4-3. State Government Employment, 1977[a]

Government Sector	Total State and Local Government Employment	State Government Employment	
		Number of Employees	Percent of Total State and Local Government Employment
Total	10,591,111	2,903,296	27.4
Education	5,198,977	1,005,093	19.3
Hospitals and Health	1,238,777	613,503	49.5
Income Maintenance	464,042	272,570	58.7
Highways	548,177	257,882	47.0
Other Transportation	31,654	5,763	18.2
Police and Fire Protection	780,673	69,682	8.9
Correction	216,826	134,049	61.8
Environment	337,208	152,426	45.2
Housing and Urban Renewal	290,343	0	0
Government Administration	631,262	195,178	30.9
Local Utilities	183,889	0	0
Transit	125,954	0	0
Other	543,329	197,150	36.3

[a]Source: Table 13, Census of Governments - Compendium of Public Employment, 1977.

Environment" user classes may be substantially larger, in absolute terms, than their same SMSA counterparts.

C. SMSA AND NON-SMSA GOVERNMENT EMPLOYMENT MIXES

While the relative sectoral employment levels in SMSA and non-SMSA areas differ more for local government activity than for commercial/industrial activity, a significant degree of similarity still exists between the two areas. Moreover, non-SMSA local governments overall have a larger proportion of their employment in user-specific FCC categories than SMSA and local governments.

1. National-Level Comparison of Governmental Activity Mixes

At the national level, the overall patterns of local government activity in SMSA and non-SMSA areas resemble each other. As shown in Figure 4-1[5] the various points representing local government sectors all lie in the

[5]The same type of 45-deg line analysis used for commercial/industrial activity is applied in Figure 4-1. (A description of this analysis is given in Part C of Section III.)

Table 4-4. Proportionate SMSA and Non-SMSA Shares of Local Government Employment, United States, 1977[a]

Employment Sector	Percent of Local Government Employment	
	SMSA Areas[b]	Non-SMSA Areas
Sectors Representative of User-Specific[c] FCC Sub-Categories:		
Education	52.6	59.8
Hospitals and Health	7.4	10.1
Highways	3.1	5.5
Police and Fire Protection	10.4	6.2
Environment		
• Natural Resources	0.3	0.5
• Local Parks and Recreation	2.5	0.9
Local Utilities	2.4	2.3
Subtotal	78.7	85.3
Sectors Not Representative of User-Specific FCC Sub-Categories:		
Income Maintenance	2.7	1.9
Other Transportation	0.4	0.1
Correction	1.2	0.6
Housing and Urban Renewal	4.3	2.4
Government Administration	5.5	6.2
Transit	2.2	0.1
Other	4.9	3.4
Subtotal	21.2	14.7

[a]Source: Derived from data in Table 13, Census of Governments - Compendium of Public Employment, 1977.

[b]SMSA sub-totals do not add to 100 because of rounding error.

[c]The user-specific FCC sub-categories include: "Public Safety - Police, Fire, Highway Maintenance, and Forestry," "Special Emergency - Medical Services, School Buses, and Beach Patrol," and "Industrial - Power, Petroleum, and Special Industrial."

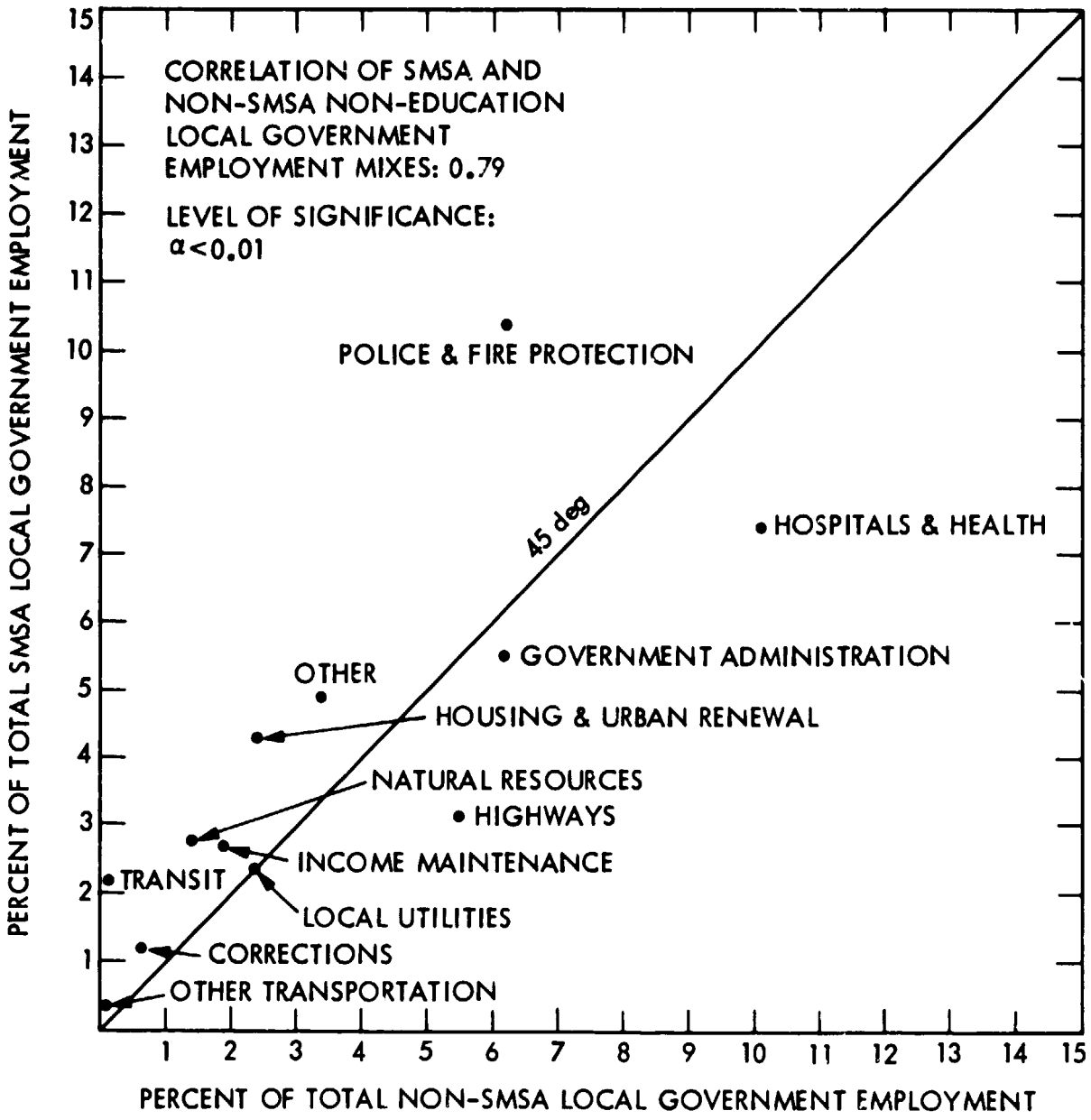

Figure 4-1. Percentage Mix of SMSA versus Non-SMSA Local Government Employment, United States, 1977

vicinity of the 45-deg line. As indicated in Table 4-5, the 0.79 correlation coefficient of this scattering of points is statistically significant and indicates that a relatively strong degree of similarity exists between SMSA and non-SMSA areas for the nation as a whole. (The "Education" sector was not included in the correlation calculation because this sector's large size relative to the other sectors causes the coefficient to overstate the extent of similarity between SMSA and non-SMSA areas.)

2. State-Level Comparison of Governmental Activity Mixes

The nine states that were analyzed exhibit widely varying degrees of similarity between the composition of their SMSA and non-SMSA local government activities. For example, as indicated in Table 4-5, the employment mixes of SMSA and non-SMSA areas in both California and Florida evince a higher degree of similarity than the nation as a whole; on the other hand, SMSA and non-SMSA areas in New York, Oregon, Iowa, and South Dakota all show lower degrees of similarity.[6]

In Oregon, Iowa, and South Dakota, the proportionately higher levels of "Highways" and "Hospitals" employment and proportionately lower levels of "Police and Fire" employment in non-SMSA areas relative to SMSA areas account for almost all of the disparity between the two areas in terms of the user-specific FCC categories. The same holds true in New York except that the "Hospitals" sector constitutes a larger proportionate share of SMSA employment compared to non-SMSA employment.

SMSA and non-SMSA areas in Montana and Pennsylvania exhibit patterns of similarity comparable to the nation as a whole. However, Alaska is unique in that all of its user-specific user classes, as represented by the Census categories, compose a significantly greater proportionate share of non-SMSA employment than SMSA employment.

In summary, even though the employment composition of SMSA and non-SMSA areas varies widely across the nine states, the overall mix of non-SMSA employment at both the national and individual state level still represents a high level of potential land mobile communication services users. In seven of the nine states analyzed, non-SMSA areas compared to SMSA areas have a larger proportion of their employment in the sectors other than education that represent FCC user-specific sub-categories (see Table 4-6). Moreover, 63% of non-education local government employment nationwide exists in sectors representative of the FCC user-specific user classes; the comparative proportion of 55% for SMSA areas is less (see Table 4-6).

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[6]Appendix F graphically portrays the relationship between SMSA and non-SMSA mixes of local government activity for each of the states analyzed.

Table 4-5. Coefficients of Correlation Between SMSA and Non-SMSA Compositions (Mixes) of Local Government Employment[a]

State	Correlation Coefficient	Significance Level
United States	0.79	$\alpha < 0.01$
Alaska	0.85	$\alpha < 0.01$
California	0.90	$\alpha < 0.01$
Florida	0.90	$\alpha < 0.01$
Iowa	0.51	$0.05 < \alpha < 0.10$
Montana	0.79	$\alpha < 0.01$
New York	0.44	$\alpha > 0.10$
Oregon	0.62	$0.02 < \alpha < 0.05$
Pennsylvania	0.71	$\alpha < 0.01$
South Dakota	0.61	$0.02 < \alpha < 0.05$

[a]The "education" sector was not included in the correlation calculation because this sector's large size relative to the other sectors causes the coefficient to overstate the extent of similarity between SMSA and non-SMSA areas.

The coefficients were calculated from the data in Table E-2.

Table 4-6. Proportion of SMSA and Non-SMSA Non-Education Local Government Employment in Sectors Representing User-Specific FCC Categories, 1977[a]

State	Proportion of SMSA and Non-SMSA Non-Education, Local Government Employment in Sectors Representing User-Specific FCC Categories	
	SMSA	Non-SMSA
United States	0.55	0.63
Alaska	0.35	0.53
California	0.54	0.57
Florida	0.61	0.66
Iowa	0.54	0.69
Montana	0.60	0.56
New York	0.48	0.50
Oregon	0.50	0.64
Pennsylvania	0.42	0.33
South Dakota	0.64	0.61

[a]The sectors that represent user-specific categories include "Hospitals," "Highways," "Police and Fire," "Environment" and "Local Utilities."

Source: Derived from data in Table E-2.

SECTION V

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APPENDIX A

DEFINITION OF STANDARD METROPOLITAN STATISTICAL AREAS (SMSAs)

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DEFINITION OF STANDARD METROPOLITAN STATISTICAL AREAS (SMSAs)

Standard Metropolitan Statistical Areas (SMSAs) are designated by the U.S. Office of Management and Budget with the advice of the Federal Committee on Standard Metropolitan Statistical Areas. Each SMSA consists of a single county area or a group of contiguous county areas, except that in New England such an area consists of a group of contiguous cities and towns. Each SMSA includes at least one "central city" of at least 50,000 inhabitants, or a city with at least 25,000 inhabitants, which, together with those contiguous places having population densities of at least 1000 persons per square mile, has a combined population of 50,000 or more and constitutes for general economic and social purposes a single community, provided that the county or counties in which the city and contiguous places are located has a total population of at least 75,000.[1]

"There were 272 SMSAs in the 50 States and the District of Columbia at the time of the 1977 Census of Governments." (Appendix A, p. 460, Compendium of Public Employment, Bureau of the Census, 1977.) Two states, Vermont and Wyoming, do not contain any SMSAs.

In 1981, the U.S. Office of Management and Budget designated 36 new SMSAs. However, because the available national aggregates for SMSA and non-SMSA commercial/industrial employment (contained in County Business Patterns -- the data base used for this study) were based on the pre-1981 SMSA designations, the analysis presented in this study is based on the pre-1981 SMSA designations.

In 1983, the Office of Management and Budget shortened the "SMSA" name to "MSA" (i.e., Metropolitan Statistical Area). This name change was not accompanied by any significant changes in the criteria used to designate metropolitan areas.

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[1]For a detailed description of criteria used to define SMSAs, see Standard Metropolitan Statistical Areas, 1975, U.S. Office of Management and Budget.

APPENDIX B

DATA-BASE DESCRIPTION

APPENDIX B

DATA-BASE DESCRIPTION

A. CROSS-CORRELATION OF FCC AND U.S. BUREAU OF THE CENSUS CATEGORIES

The FCC has promulgated rules under Title II of the Communications Act of 1934 that define categories of non-federal government activities that may obtain licenses for and use radio communication systems in the private land mobile radio service frequencies (FCC, March 1979). While these categories encompass most all commercial, industrial, and governmental activities (and therefore are relevant to aggregating Census data into categories of land mobile communication services users), they do not correspond directly with the U.S. Bureau of the Census Standard Industrial Classification (SIC) system for categorizing economic and governmental activity. Therefore, the FCC categories were cross-matched with the Census SIC categories (1) to establish whether the Census classification system encompassed the relevant FCC categories and (2) to provide a framework for comparing the characteristics of SMSA and non-SMSA land mobile communication services user classes.

As a first step in assessing the compatibility of FCC and Census categories, the FCC eligible radio service categories and sub-categories were cross-matched with Census SIC categories and sub-categories as shown in Table B-1. The first column in Table B-1 lists the four FCC Private Land Mobile Radio Service categories and their constituent sub-categories. The second column shows the specific Census SIC categories and sub-categories that encompass each FCC sub-category. The third column shows the categories and sub-categories that were selected from published Census data bases for this analysis.

The FCC defines four major types of private land mobile radio services: Public Safety, Special Emergency, Industrial, and Land Transportation. The Census, on the other hand, has eleven major SIC categories that represent the major economic divisions of the economy: Agriculture; Forestry and Fisheries; Mining; Construction; Manufacturing; Transportation; Communications and Public Utilities; Wholesale Trade; Retail Trade; Finance, Insurance, and Real Estate; Services; and Public Administration.

1. Differences in FCC and Census Category Definitions

Because the FCC focuses on the application purpose of private land mobile radio services in defining user categories, as opposed to the Census' emphasis on types of economic/government activity, a one-to-one correspondence does not exist between the FCC and Census categories. While the FCC categories as a whole encompass all of the Census commercial, industrial and non-federal governmental categories, the individual FCC categories and their associated sub-categories, as demonstrated in Table B-1, in many cases cover only part of one or a number of major Census categories. Also, while all the Census SIC sub-categories are mutually exclusive, some of the FCC sub-categories overlap. For example, as indicated in Table B-1, a local fire department that provides paramedical services would be classified by the Census as "State and Local Government Public Safety - Fire Protection" (SIC

9224), but it could presumably petition the FCC for a license under any one of three sub-categories: "Public Safety - Local Government," "Public Safety - Fire," or "Special Emergency - Medical Services." Similarly, local government-operated utilities would likely be eligible under both the "Public Safety - Local Government" and "Industrial - Power" sub-categories; however, the Census would use the same SIC sub-category (SIC 49 - Electric, Gas and Sanitary Services) for this activity irrespective of whether local utilities were provided privately or by government.

The level of aggregation also varies between the FCC and Census category definitions. As shown in the left-hand column of Table B-1, two of the four FCC categories, i.e., "Public Safety" and "Special Emergency," primarily represent government-provided services; only one of the eleven major Census categories, i.e., Public Administration, focuses exclusively on government services.[1] Also, while the Census separates non-transportation commercial/industrial activities into nine major categories, the FCC collects all these activities except for emergency repair of public communications under one major category -- "Industrial." Again, these differences between the two classification systems simply reflect the different focus of the two agencies.

2. Selection of Census Categories for Comparing Land Mobile Communication Services User Classes in SMSA Versus Non-SMSA Areas

Because the focus of this study is to compare SMSA and non-SMSA user classes of land mobile communication services based on commercial/ industrial and governmental activity, two major Census data bases that provide location-referenced information, County Business Patterns and the Compendium of Government Employment, were selected as the basis for the analysis. (Section II.A of this report describes these data bases, their advantages, and their limitations.) Even though the FCC and SIC categories differ as described above, the major breakdowns of commercial, industrial, and governmental activity in these data bases are sufficient for distinguishing between the various user types of land mobile communication services. As shown in the third column of Table B-1, the major SIC categories for commercial/industrial activities and the selected aggregations of government activity sub-categories are representative of the FCC categories. Most of the Census categories appear repeatedly in the third column of the table because of the overlapping nature of the FCC categories and/or the inclusion of more than one FCC sub-category within the same Census SIC category.

a. Public Safety. The categories contained in the Census' Compendium of Public Employment cover the entire range of potential "Public Safety" private land mobile radio services. As shown in Table B-1, the relevant categories and aggregations of sub-categories represent the five radio service sub-categories. The "Local Government" sub-category encompasses

[1]While the Census uses the same SIC categories for classifying services provided by both local governments and the private sector (e.g., hospitals, utilities), it publishes separate location-referenced aggregations of commercial/industrial and governmental activities.

the entire range of government activities, while the "Police," "Fire," "Highway Maintenance," and "Forestry-Conservation" sub-categories correspond to aggregations of individual Census government sub-categories.

b. Special Emergency. The Census categories represent most all of the activities represented by the "Special Emergency" radio service categories. Neither of the selected Census data bases identify the level or location of handicapped individuals or isolated establishments. However, by definition, the vast majority of potential users eligible as "Establishments in Isolated Areas" will exist outside SMSAs. As indicated in Table B-1, "Special Emergency" corresponds to a mix of government and commercial/industrial Census categories.

c. Industrial. Similar to the "Special Emergency" category, the "Industrial" category coincides with a combination of Census government and commercial/industrial categories. The "Power," "Petroleum," and "Special Industrial" sub-categories include activities performed by both government and industry, while the "Motion Picture," "Relay Press," "Business," "Manufacturing," and "Telephone Maintenance" sub-categories represent commercial/industrial activities only. As indicated in Table B-1, the selected Census data bases fully cover all these activities.

d. Land Transportation. All activities eligible for the "Land Transportation" radio service except "Railroad" are covered by the "Transportation, Communications and Utilities" and "Services" categories contained in County Business Patterns.

Table B-1. Comparison of Census Standard Industrial Classification (SIC) and FCC Private Land Mobile Radio Service Categories and Sub-Categories[a]

FCC PRIVATE LAND MOBILE RADIO SERVICE CATEGORY	CENSUS SIC CATEGORY/SUB-CATEGORY	SELECTED CENSUS DATA SOURCES, CATEGORIES, AND SUB-CATEGORIES
PUBLIC SAFETY	Public Administration (91-97)	DATA SOURCE: CGE
- Local Government	- All State, County, Municipality and Township Government Functions Except School and Special Districts[a]	• Social Services and Income Maintenance - Hospitals & Health - Public Welfare + Social Insurance Administration • Transportation - Highways - Air Transportation + Water Transportation • Public Safety - Police Protection + Fire Protection - Correction • Environment and Housing - Natural Resources + Local Parks and Recreation - Housing and Urban Renewal + Sewerage + Sanitation Other Than Sewerage • Government Administration • Local Utilities - Water Supply + Electric Power + Gas Supply - Transit • Other
- Police	- State and Local Government Public Safety - Police Protection (9221, 9223)	• Public Safety - Police Protection + Fire Protection
- Fire	- State and Local Government Public Safety - Fire Protection (9224)	
- Highway Maintenance	- State and Local Government Transportation - Highways (1611, 1622, 4452, 4784)	• Transportation - Highways
- Forestry-Conservation	- State and Local Government Environment and Housing-Natural Resources (0851, 0921, 0971, 1629, 4971, 9512, 9631, 9641)	• Environment and Housing - Natural Resources + Local Parks and Recreation
SPECIAL EMERGENCY		DATA SOURCE: CGE, CBP
- Medical Services	- State and Local Government Social Services and Income Maintenance - Hospitals, Health (8081, 9431, 9641); Health Services (80); Colleges and Universities (822); Membership Organizations (86); State and Local Government Public Safety - Fire Protection (9224)	CATEGORY (CGE): • Social Services and Income Maintenance - Hospitals + Health • Public Safety - Fire Protection CATEGORY (CBP): • Services
- Rescue Organizations	- Health Services (809, 8091)	. . .
- Physically Handicapped	- N/A	N/A

Table B-1. Comparison of Census Standard Industrial Classification (SIC) and FCC Private Land Mobile Radio Service Categories and Sub-Categories (Cont'd)[a]

FCC PRIVATE LAND MOBILE RADIO SERVICE CATEGORY	CENSUS SIC CATEGORY/SUB-CATEGORY	SELECTED CENSUS DATA SOURCES, CATEGORIES, AND SUB-CATEGORIES
SPECIAL EMERGENCY (continued)		
- Veterinarians	- Agricultural Services - Veterinary Services (074); Colleges and Universities (822)	CATEGORY (CBP): • Agricultural Services • Services
- Disaster Relief Organizations	- Membership Organizations (869)	CATEGORY (CBP): • Services
- School Buses	- State and Local Government Education Services - Local Schools (8211, 4151); School Buses (415)	CATEGORY (CGE): • Education Services CATEGORY (CBP): • Transportation, Communications, and Utilities
- Beach Patrols	- State and Local Government Parks and Recreation (0782, 4469, 7992, 7999, 8411, 8421, 9512)	CATEGORY (CGE): • Environment and Housing - Natural Resources + Local Parks and Recreation
- Establishment in Isolated Areas	- N/A	N/A
- Communication Standby Facilities	- Communication (48)	CATEGORY (CBP): • Transportation, Communications, and Utilities
- Emergency Repair of Public Communications	- Communication (48)	• Transportation, Communications, and Utilities
INDUSTRIAL	DATA SOURCE: CGE, CBP	
- Power	- Electric, Gas and Sanitary Services (49)	CATEGORY: CGE • Local Utilities CATEGORY: CBP • Transportation, Communication, and Utilities
- Petroleum	- Oil and Gas Extraction (13); Pipe Lines, Except Natural Gas (46); Petroleum Refining (291); Natural Gas Transmission (492)	CATEGORY: CGE • Environment and Housing - Natural Resources CATEGORY: CBP • Mining • Manufacturing • Transportation, Communications, and Utilities
- Motion Picture	- Motion Picture Production and Allied Services (781)	CATEGORY: CBP • Services

Table B-1. Comparison of Census Standard Industrial Classification (SIC) and FCC Private Land Mobile Radio Service Categories and Sub-Categories (Cont'd)[a]

FCC PRIVATE LAND MOBILE RADIO SERVICE CATEGORY	CENSUS SIC CATEGORY/SUB-CATEGORY	SELECTED CENSUS DATA SOURCES, CATEGORIES, AND SUB-CATEGORIES
INDUSTRIAL (continued)		
- Relay Press	- Newspapers (271); News Syndicates (735)	CATEGORY: CBP • Manufacturing • Services
- Special Industrial	- Agricultural Services (07); Heavy Construction Contractors (16); Mining, Except Oil and Gas Extraction (10, 11, 12, 14); Electric, Gas and Sanitary Services, Except Refuse Systems (491-494, 4952, 4959 496, 497); Oil and Gas Production (13); Fuel and Ice Dealers (598); Lumber and Construction Materials (503)	CATEGORY: CGE • Local Utilities CATEGORY: CBP • Agricultural Services • Mining • Contract Construction • Manufacturing • Transportation, Communications, and Utilities • Wholesale Trade • Retail Trade
- Business	- Wholesale Trade (50, 51); Retail Trade (52, 53-59); Finance, Insurance, and Real Estate (60-67); Services (70, 72, 73, 75, 76, 78-84, 866,89); Public Warehousing (422)	CATEGORY: CBP • Wholesale Trade • Retail Trade • Finance, Insurance, and Real Estate • Services
- Manufacturing	- Manufacturing (20-39)	CATEGORY: CBP • Manufacturing
- Telephone Maintenance	- Telephone Communication (481); Telegraph Communication (482)	CATEGORY: CBP • Transportation, Communications, and Utilities
LAND TRANSPORTATION		DATA SOURCE: CBP CATEGORY: CBP
- Motor Carrier	- Local and Suburban Transportation (411, 413); Trucking, Local and Long Distance (421); Intercity Highway Transportation (413)	• Transportation, Communications, and Utilities
- Railroad	- N/A	N/A
- Taxicab	- Taxicabs (412); Transportation Charter Service (414)	• Transportation, Communications, and Utilities
- Automobile Emergency	- Membership organizations, n.e.c. (869); Gasoline Service Stations (554); General Automotive Repair Shops (7538)	• Retail Trade • Services

[a]Detailed SIC numbers for government activities are from "Measuring Productivity in State and Local Government," Bureau of Labor Statistics Bulletin 2161, Appendix B, pp. 84-86, December 1983.

CGE: 1977 Census of Governments, "Compendium of Public Employment," U.S. Department of Commerce, Bureau of the Census, Issued July 1979.

CBP: County Business Patterns 1981," United States CBP-81-1," U.S. Department of Commerce, Bureau of the Census, Issued July 1983.

N/A: Data for this subcategory was not available in the data bases used in the CGE or CBP.

APPENDIX C

COMPARISON OF SMSA AND NON-SMSA INDIVIDUAL COMMERCIAL/INDUSTRIAL SECTORS

APPENDIX C

COMPARISON OF SMSA AND NON-SMSA INDIVIDUAL COMMERCIAL/INDUSTRIAL SECTORS

The analysis of employment in the individual SIC categories at the state level indicates that in the majority of cases the proportions of overall SMSA and non-SMSA activity in a given sector are similar. At a detailed level, the individual sectors can be classified in one of four ways: (1) the sector's proportionate shares of SMSA and non-SMSA employment vary without any clearly definable pattern; (2) the sector's proportionate SMSA and non-SMSA shares are clearly similar; (3) the sector's proportionate share of non-SMSA employment is consistently higher than its SMSA counterpart; or (4) the sector's proportionate share of non-SMSA employment is consistently lower than its SMSA counterpart.

A. SECTORS LACKING DISTINCT SMSA VS. NON-SMSA PATTERNS OF VARIANCE

As shown in Figures C-1, C-2, and C-3, the share of employment in "Agricultural Services," "Wholesale Trade," and "Nonclassifiable Establishments" do not exhibit any consistent pattern across the various states that were analyzed.[1] However, based on a statistical analysis of variance (see Table C-1), the exhibited differences do not provide sufficient basis for concluding that any of these three sectors comprise a significantly larger or smaller proportion of overall employment in either SMSA or non-SMSA areas. Moreover, at the national level, as indicated in Table C-2, these three sectors compose substantially similar proportions of overall SMSA and non-SMSA employment.

Therefore, from a nationwide point of view, potential land mobile communication services user classes from the "Agricultural Services," "Wholesale Trade," and "Nonclassifiable Establishments" sectors (eligible for "Industrial - Special Industrial" and "Industrial - Business" private land mobile radio service) exist in relatively constant proportions both inside and outside SMSAs.

B. SECTORS WITH SIMILAR SMSA AND NON-SMSA SHARES OF COMMERCIAL/INDUSTRIAL EMPLOYMENT.

Both SMSA and non-SMSA areas of the states analyzed have substantially similar proportions of commercial/industrial employment in the "Transportation, Communications, and Utilities," "Contract Construction," and "Manufacturing" sectors.

As shown in Figure C-4, the proportions of SMSA and non-SMSA people employed in the "Transportation, Communications, and Utilities" sector are nearly equivalent in six of the nine states. Nationwide, 6.4% of SMSA and 5.1% of non-SMSA commercial/industrial employment exists in this sector.

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[1]Table C-2 was the source of data for Figures C-1 to C-9.

For "Contract Construction," eight of the nine states have SMSA and non-SMSA shares of employment within two percentage points of each other. For the country as a whole, this sector comprises 5.8 and 5.6% of commercial/industrial employment in SMSA and non-SMSA areas, respectively (see Figure C-5).

Even though the non-SMSA proportionate share of "Manufacturing" employment is larger than the SMSA share in seven of the nine states analyzed (see Figure C-6) the difference is not sufficient to conclude that non-SMSA areas have a statistically significant greater relative proportion of "Manufacturing" employment (see Table C-1); however, nationwide (as noted above), non-SMSA areas have slightly more of their commercial/industrial employment in "Manufacturing" than SMSA areas.

Therefore, in terms of the FCC categories presented in Table B-1, non-SMSA and SMSA areas have similar proportions of the prospective land mobile communication services user classes that totally or partly constitute the following sub-categories: "Communications Standby Facilities," "Emergency Repair of Public Communications," "Manufacturing," "Telephone Maintenance," "Motor Carrier," "Taxicab," "School Buses," "Power," "Petroleum," "Relay Press," and "Special Industrial" sub-categories.

C. SECTORS CONSTITUTING A GREATER PROPORTION OF NON-SMSA EMPLOYMENT THAN SMSA EMPLOYMENT

Non-SMSA areas typically have a greater proportion of their overall employment in the "Retail Trade" and "Mining" sectors than SMSA areas. This relationship exists in the majority of states analyzed and for the country as a whole.

As shown in Figure C-7, non-SMSA areas in seven of the nine states that were analyzed have a greater proportionate share of their employment in the "Retail Trade" sector than their SMSA counterpart areas. Only Montana has a significantly greater proportion of employment in this sector in SMSA areas, while Alaska has virtually identical shares in both types of areas. Nationwide, "Retail Trade" constitutes 24% of non-SMSA employment and 20% of SMSA employment.

Non-SMSA areas also have a higher proportion of their overall employment in "Mining" than SMSA areas. As indicated in Figure C-8, the non-SMSA proportion of overall employment in "Mining" exceeds the SMSA proportion in all of the nine states that were analyzed. Nationwide, "Mining" constitutes 4.4% of non-SMSA employment and 0.8% of SMSA employment.

In terms of the FCC categories, the different SMSA and non-SMSA employment proportionate levels of activity in "Retail Trade" and "Mining" are not large enough to significantly impact the overall proportions of SMSA and non-SMSA potential users satisfying the FCC's definitions of "Business," "Petroleum," or "Special Industrial" activities.

D. SECTORS CONSTITUTING A SMALLER PROPORTION OF NON-SMSA EMPLOYMENT THAN SMSA EMPLOYMENT

SMSAs have a greater proportion of their overall employment in the "Services" and "Finance, Insurance, and Real Estate" sectors than non-SMSA areas. This relationship exists both nationwide and in all nine states that were evaluated (see Figures C-9 and C-10).

Non-SMSA areas, on a national scale, have 27% less "Services" sector activity than SMSA areas. However, this sector still constitutes 18.2% of non-SMSA employment. Moreover, in states such as Montana and South Dakota, where more than half of commercial/industrial activity occurs outside SMSAs, non-SMSA areas (as shown in Figure C-8) have only marginally less "Services" activity than SMSA areas.

"Finance, Insurance, and Real Estate" is the only sector of the economy in which non-SMSA areas have a significantly smaller share of commercial/industrial activity than SMSA areas. On a national scale, non-SMSA workers in this sector still constitute 4.7% of non-SMSA employment as compared to SMSA's 7.9% share. However, unlike the "Manufacturing," "Retail Trade," and "Services" sectors, the "Finance, Insurance, and Real Estate" sector is not one of the nation's largest sectors (i.e., overall it constitutes 7% of employment); therefore, the difference in shares between SMSA and non-SMSA areas does not indicate a significant difference in SMSA and non-SMSA employment characteristics.

Overall, the differences between SMSA and non-SMSA activity in the "Services" and "Finance, Insurance and Real Estate" sectors, from the viewpoint of the FCC "Industrial - Business" category (i.e., the category that entirely encompasses these two Census categories), imply less than a ten percentage point difference in SMSA and non-SMSA proportionate levels of potential land mobile communication services users.

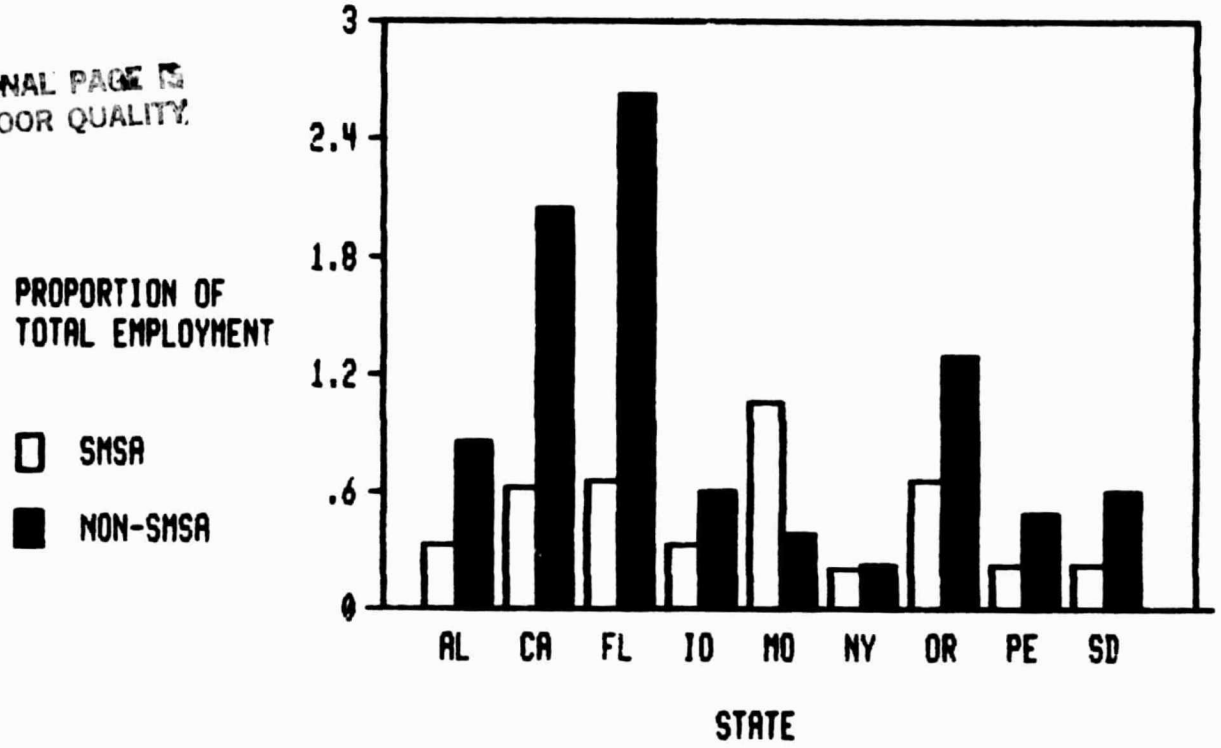

Figure C-1. SMSA versus Non-SMSA Employment - Agricultural Services, 1981

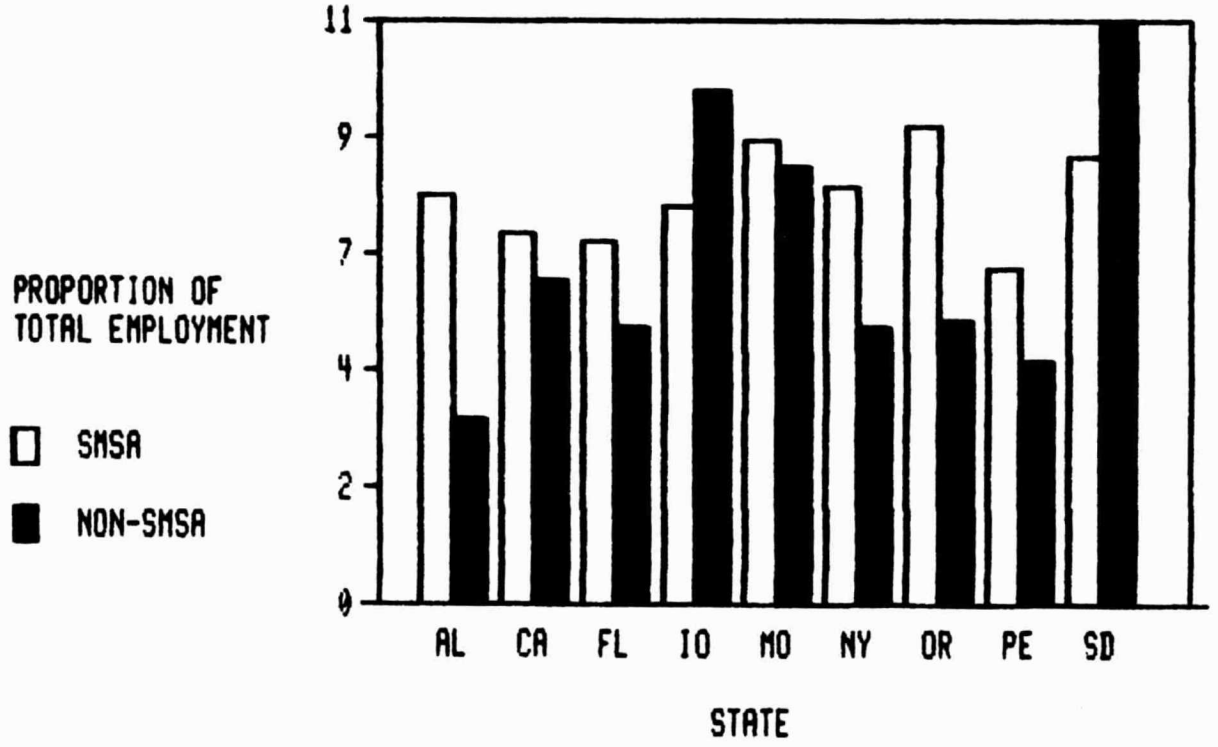

Figure C-2. SMSA versus Non-SMSA Employment - Wholesale Trade, 1981

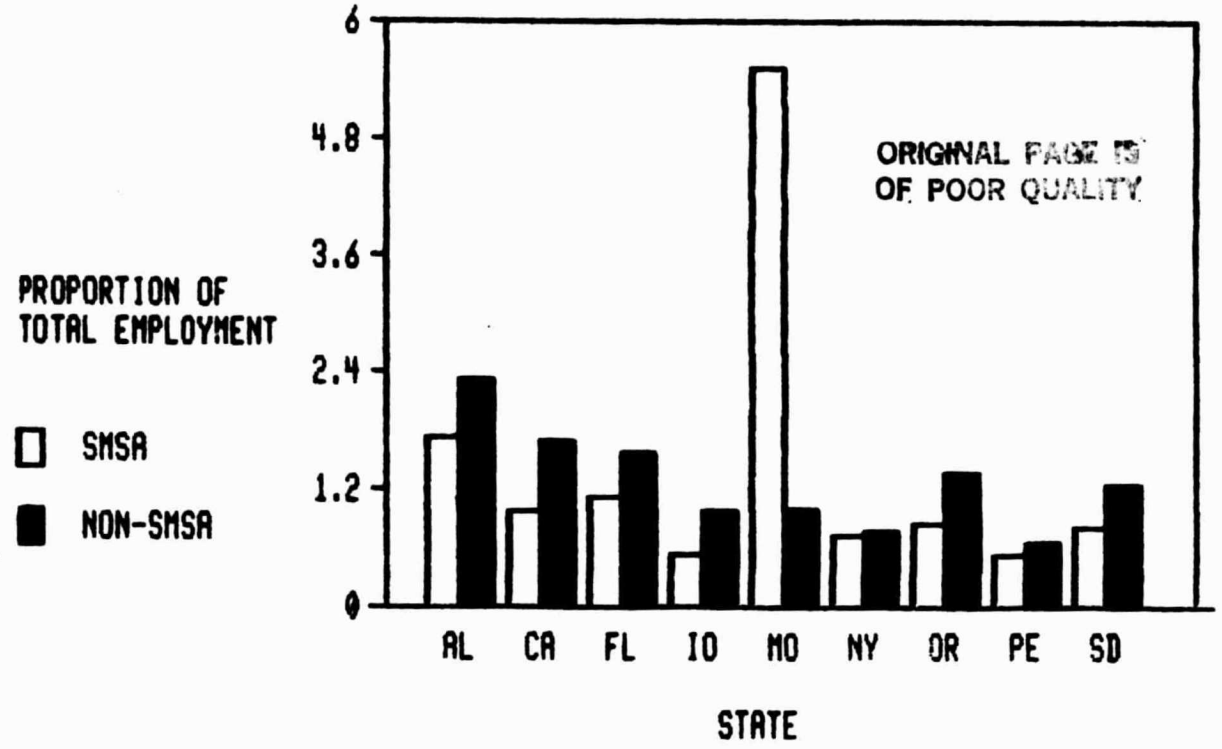

Figure C-3. SMSA versus Non-SMSA Employment - Nonclassifiable Establishments, 1981

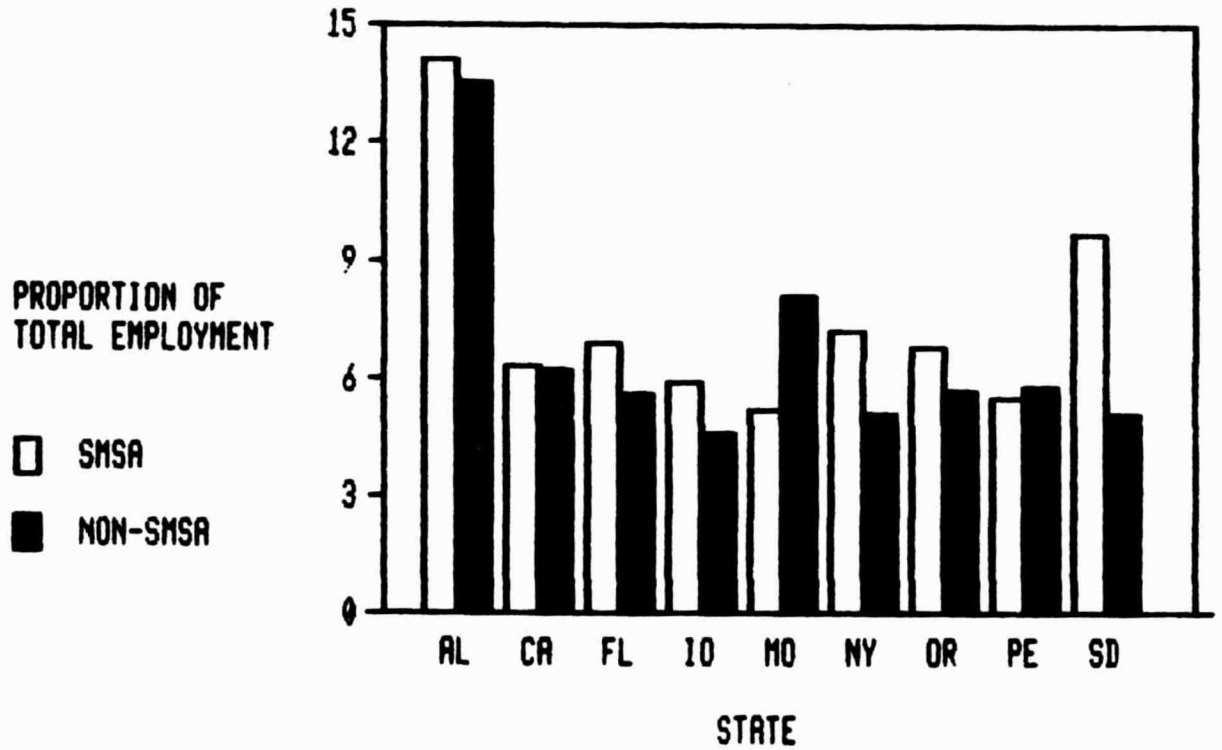

Figure C-4. SMSA versus Non-SMSA Employment - Transportation & Utilities, 1981

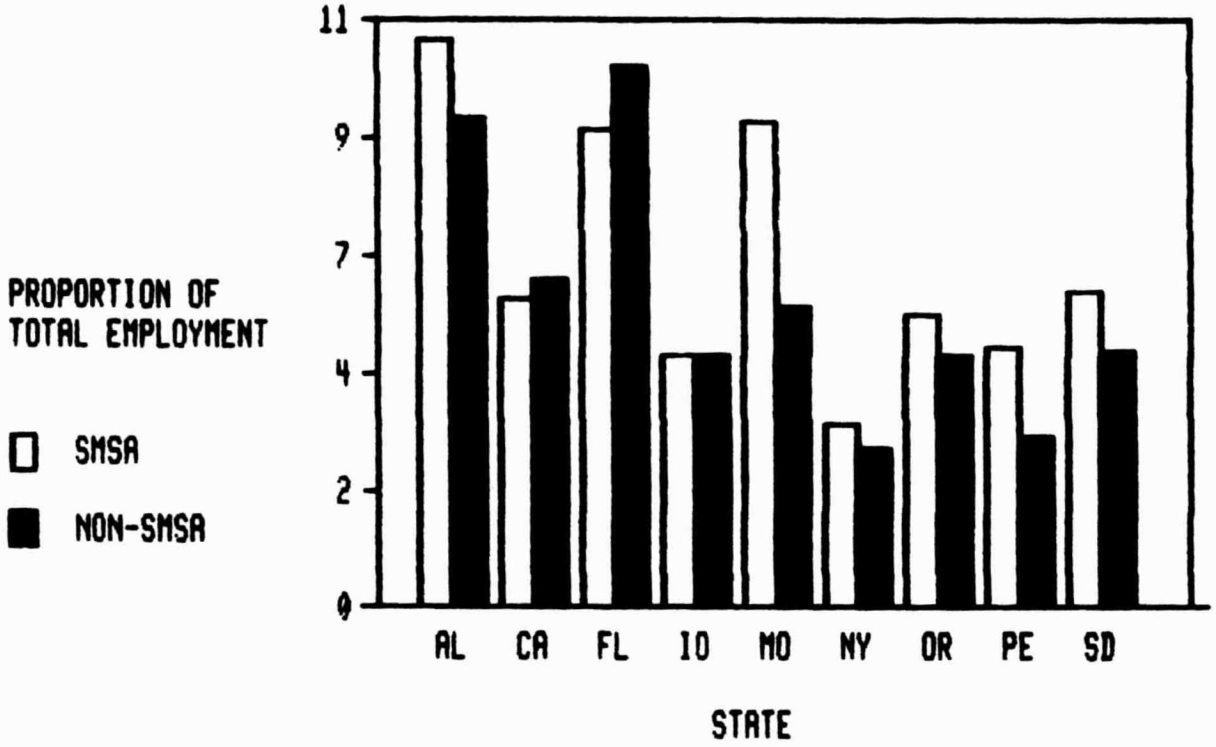

Figure C-5. SMSA versus Non-SMSA Employment - Contract Construction, 1981

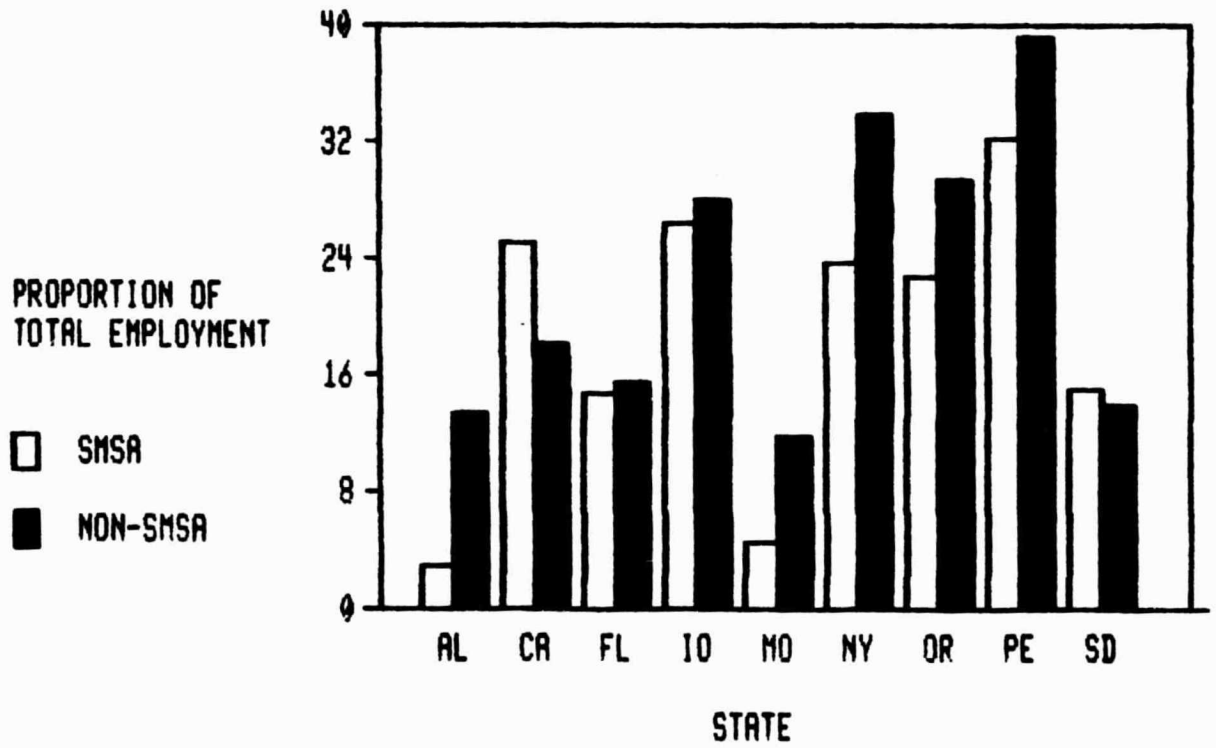

Figure C-6. SMSA versus Non-SMSA Employment - Manufacturing, 1981

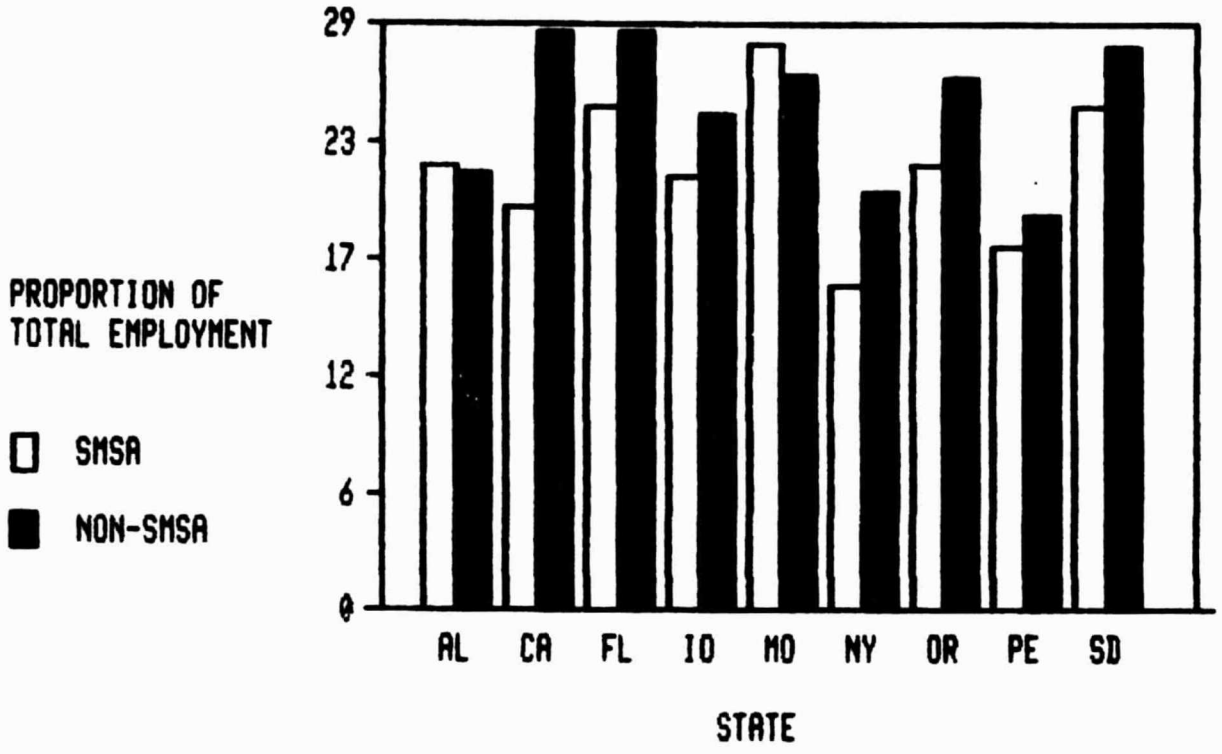

Figure C-7. SMSA versus Non-SMSA Employment - Retail Trade, 1981

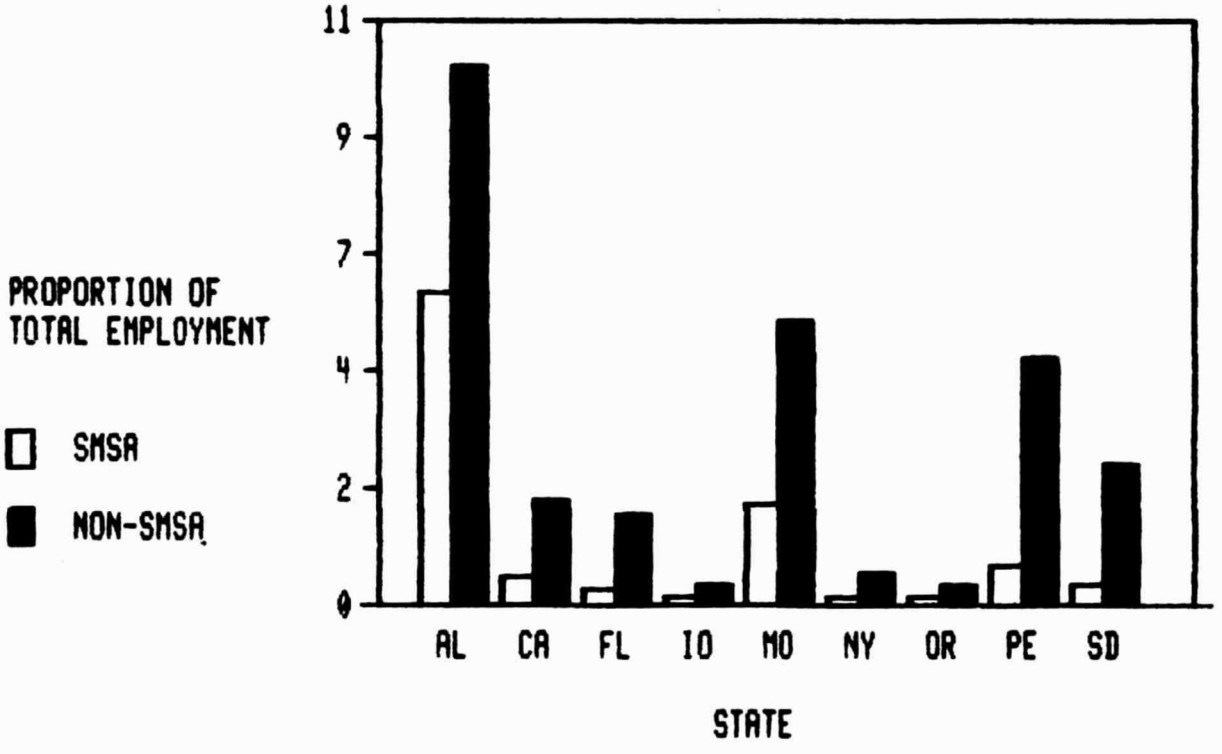

Figure C-8. SMSA versus Non-SMSA Employment - Mining, 1981

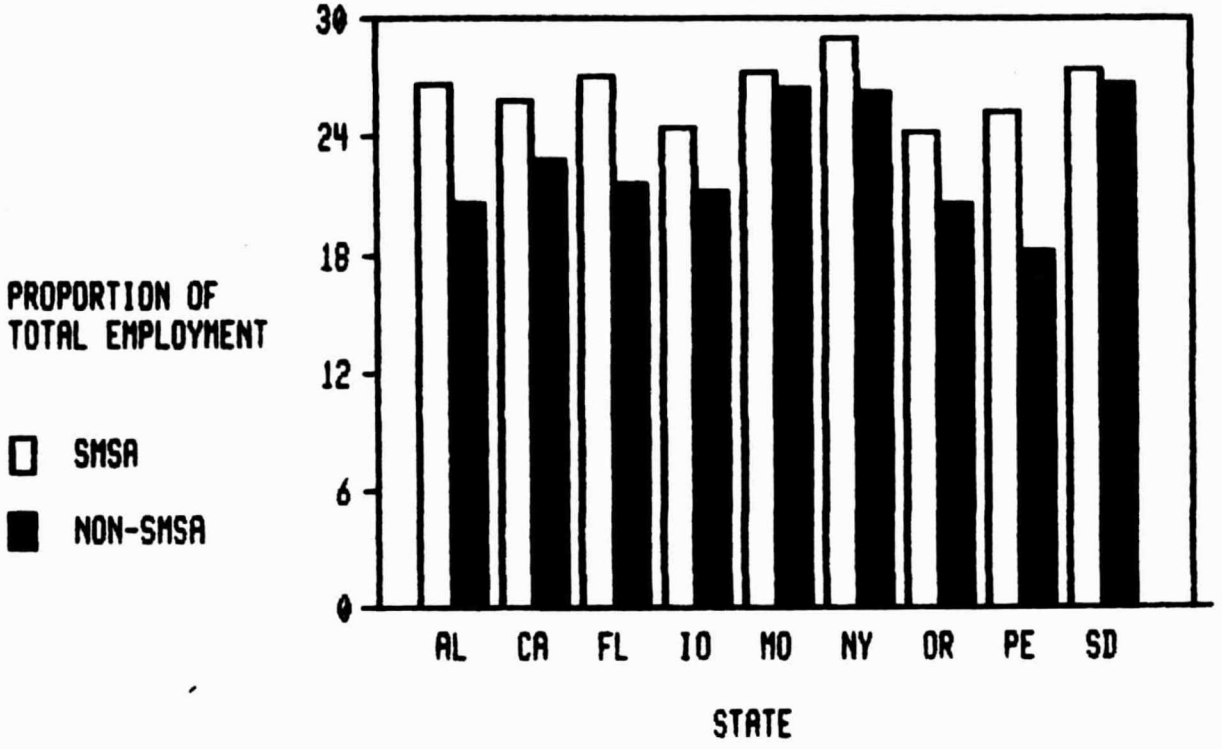

Figure C-9. SMSA versus Non-SMSA Employment - Services, 1981

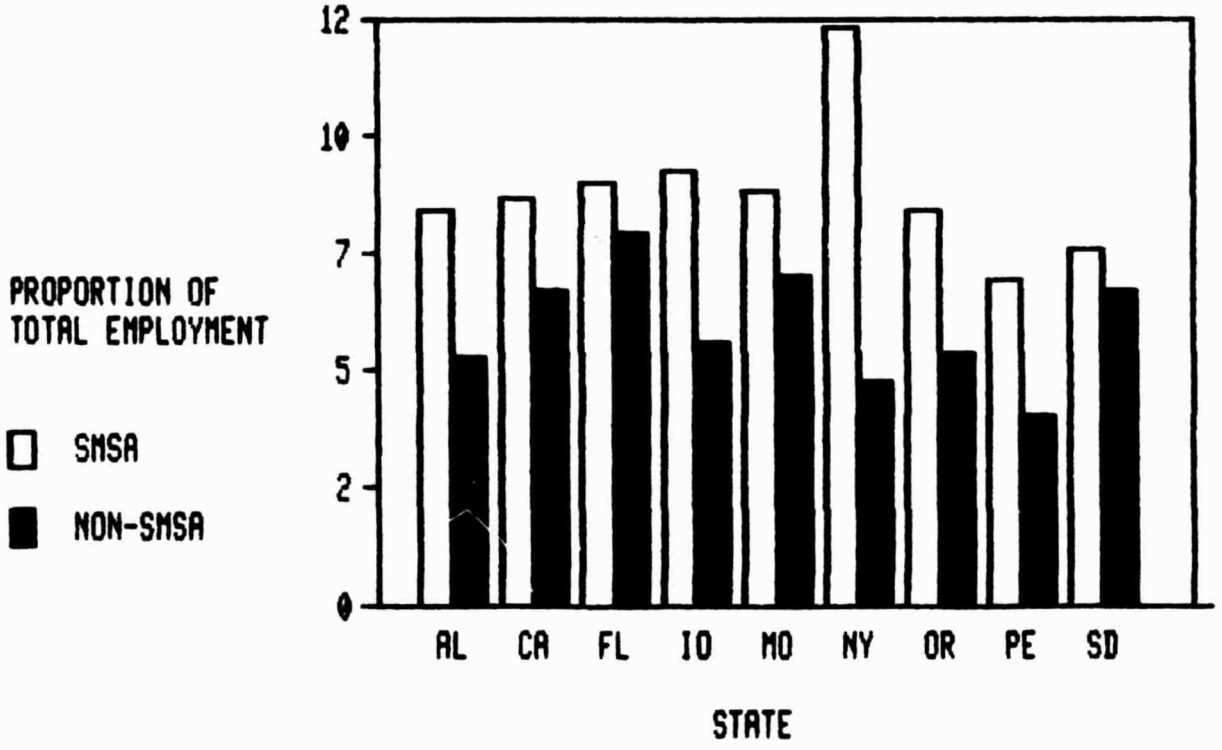

Figure C-10. SMSA versus Non-SMSA Employment - Finance, Real Estate, & Insurance, 1981

Table C-1. Commercial/Industrial Two-Factor Analysis of Variance[a]

EMPLOYMENT CATEGORY	TREATMENTS SUM OF SQUARES	BLOCKS SUM OF SQUARES	ERROR SUM OF SQUARES	TOTAL SUM OF SQUARES	MEAN SQUARE TREATMENTS	MEAN SQUARE BLOCKS	MEAN SQUARE ERROR	$F=\frac{MST}{MSE}$ (b)	$F=\frac{MSB}{MSE}$ (c)
Agriculture	1.32	3.74	2.40	7.46	1.32	0.47	0.30	4.42	1.56
Mining	16.87	98.93	10.31	126.11	16.87	12.37	1.29	13.09(d)	9.60(d)
Contract Construction	2.92	86.65	7.22	96.79	2.92	10.83	0.90	3.24	12.00(d)
Manufacturing	69.60	1483.62	131.14	1684.35	69.60	185.45	16.39	4.25	11.31(d)
Transportation and Utilities	3.43	108.10	16.31	127.84	3.43	13.51	2.04	1.68	6.63(d)
Wholesale Trade	6.46	35.30	22.02	63.78	6.46	4.41	2.75	2.35	1.60
Retail Trade	40.87	174.30	36.91	252.08	40.87	21.79	4.61	8.86(e)	4.72(e)
Finance, Insurance & Real Estate	35.48	13.57	14.74	63.79	35.48	1.70	1.84	19.26(d)	0.92
Services	58.50	74.67	18.63	151.80	58.50	9.33	2.33	25.12(d)	4.01(e)
Nonclassifiable Establishments	0.08	11.23	11.04	22.35	0.08	1.40	1.38	0.06	1.02

[a]Based on analysis of individual State data in Table C-2.

(b) F Statistic for Variations explained by SMSA vs. non-SMSA location.

(c) F Statistic for Variations explained by individual state blocking factor.

(d) $\alpha < .01$

(e) $.05 > \alpha > .01$

Table C-2. Percentage Composition of SMSA and Non-SMSA Commercial/Industrial Employment by Sector for the United States and Selected States, 1981[a]

EMPLOYMENT SECTOR	STATE																			
	UNITED STATES		ALASKA		CALIFORNIA		FLORIDA		IOWA		MONTANA		NEW YORK		OREGON		PENNSYLVANIA		SOUTH DAKOTA	
	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA
Agricultural Services, Forestry, Fisheries	0.4	0.6	0.3	0.9	0.6	2.0	0.7	2.6	0.3	0.6	1.1	0.4	0.2	0.2	0.7	1.3	0.2	0.5	0.3	0.6
Mining	0.8	4.3	5.8	10.1	0.5	2.0	0.3	1.7	0.1	0.3	1.9	5.4	0.1	0.6	0.2	0.4	0.7	4.6	0.4	2.6
Contract Construction	5.8	5.5	10.6	9.1	5.8	6.1	9.0	10.1	4.7	4.8	9.1	5.7	3.4	3.0	5.5	4.7	4.9	3.3	6.0	4.9
Manufacturing	26.0	31.8	3.0	13.3	25.0	18.2	14.8	15.4	26.3	27.9	4.6	11.7	23.6	33.8	22.7	29.4	32.1	39.1	15.0	13.8
Transportation, Communications and Utilities	6.4	5.1	14.1	13.5	6.3	6.1	6.9	5.6	5.9	4.6	5.2	8.1	7.1	5.1	6.8	5.7	5.5	5.7	9.7	5.1
Wholesale Trade	7.3	5.7	7.7	3.5	7.0	6.1	6.8	5.2	7.5	9.7	8.7	8.2	7.9	5.2	9.0	5.3	6.3	4.6	8.4	10.9
Retail Trade	19.8	23.3	22.0	21.7	19.8	28.6	24.8	28.7	21.4	24.5	28.1	26.4	16.0	20.7	22.0	26.2	17.9	19.5	24.9	27.9
Finance, Insurance, and Real Estate	7.9	4.6	8.1	5.0	8.3	6.4	8.7	7.6	8.8	5.4	8.5	6.7	11.9	4.5	8.1	5.2	6.6	3.8	7.2	6.4
Services	25.1	18.2	26.6	20.6	25.8	22.7	26.9	21.6	24.4	21.2	27.2	26.4	29.0	26.2	24.1	20.5	25.1	18.2	27.3	26.6
Nonclassifiable Establishments	0.7	1.0	1.7	2.3	1.0	1.7	1.1	1.5	0.5	1.0	5.5	1.0	0.7	0.8	0.8	1.4	0.5	0.6	0.8	1.2

[a]Source: Derived from data in County Business Patterns, 1981.

APPENDIX D

STATE-LEVEL COMPARISONS OF SMSA AND NON-SMSA COMMERCIAL/INDUSTRIAL ACTIVITY MIXES

APPENDIX D

STATE-LEVEL COMPARISONS OF SMSA AND NON-SMSA COMMERCIAL/INDUSTRIAL ACTIVITY MIXES

The graphs in this appendix depict the relationship between SMSA and non-SMSA mixes of commercial/industrial activity in Alaska, California, Florida, Iowa, Montana, New York, Oregon, Pennsylvania, and South Dakota.

The vertical and horizontal axes in Figures D-1 to D-9 represent the respective percentages of SMSA and non-SMSA employment contained in each commercial/industrial sector. The 45-deg line in each figure highlights the points on the graph where the percentage of total non-SMSA employment in a given commercial/industrial sector equals the percentage of total SMSA employment in the same sector.

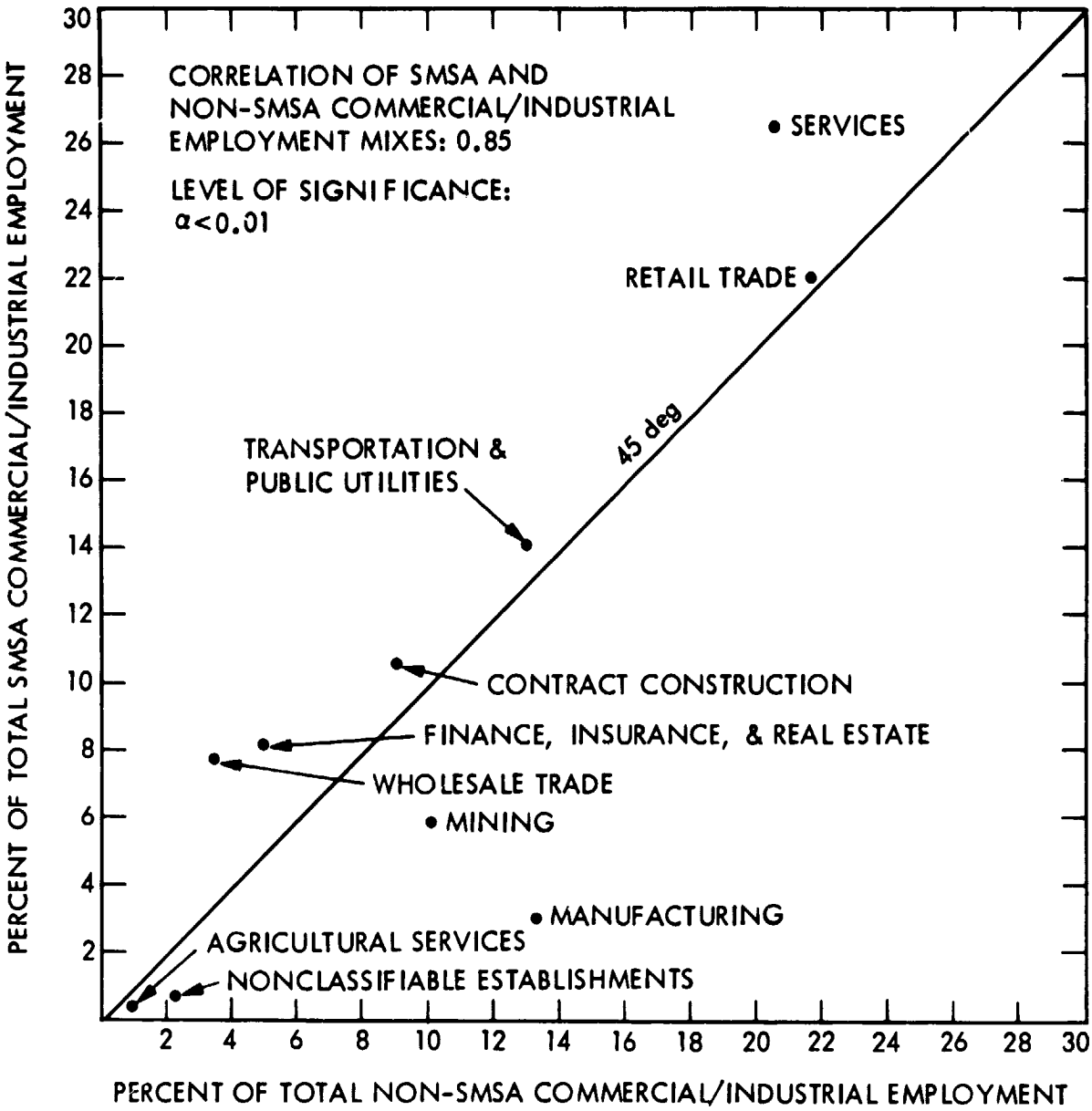

Figure D-1. Percentage Mix of SMSA versus Non-SMSA Commercial/ Industrial Employment, Alaska, 1981

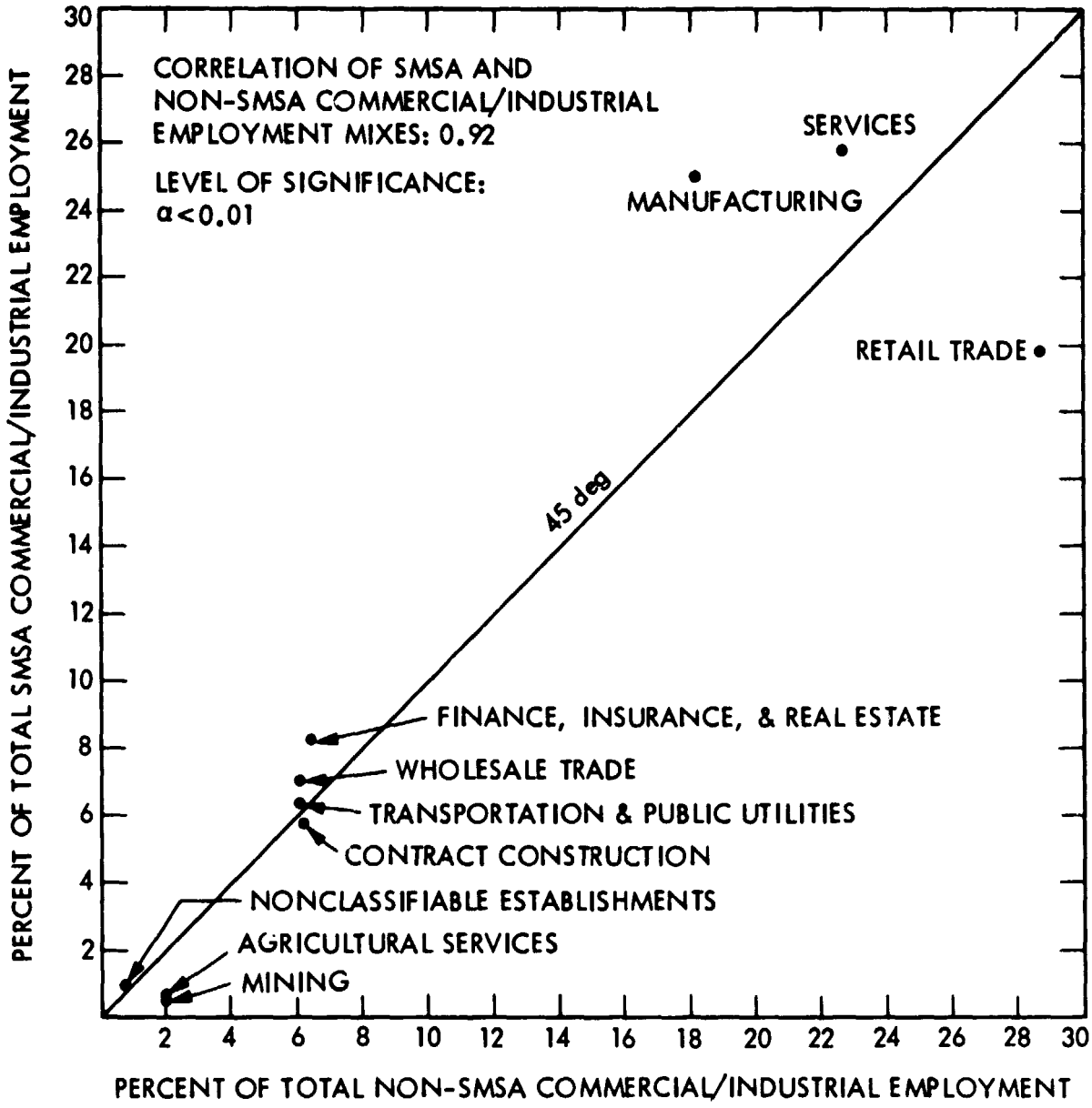

Figure D-2. Percentage Mix of SMSA versus Non-SMSA Commercial/ Industrial Employment, California, 1981

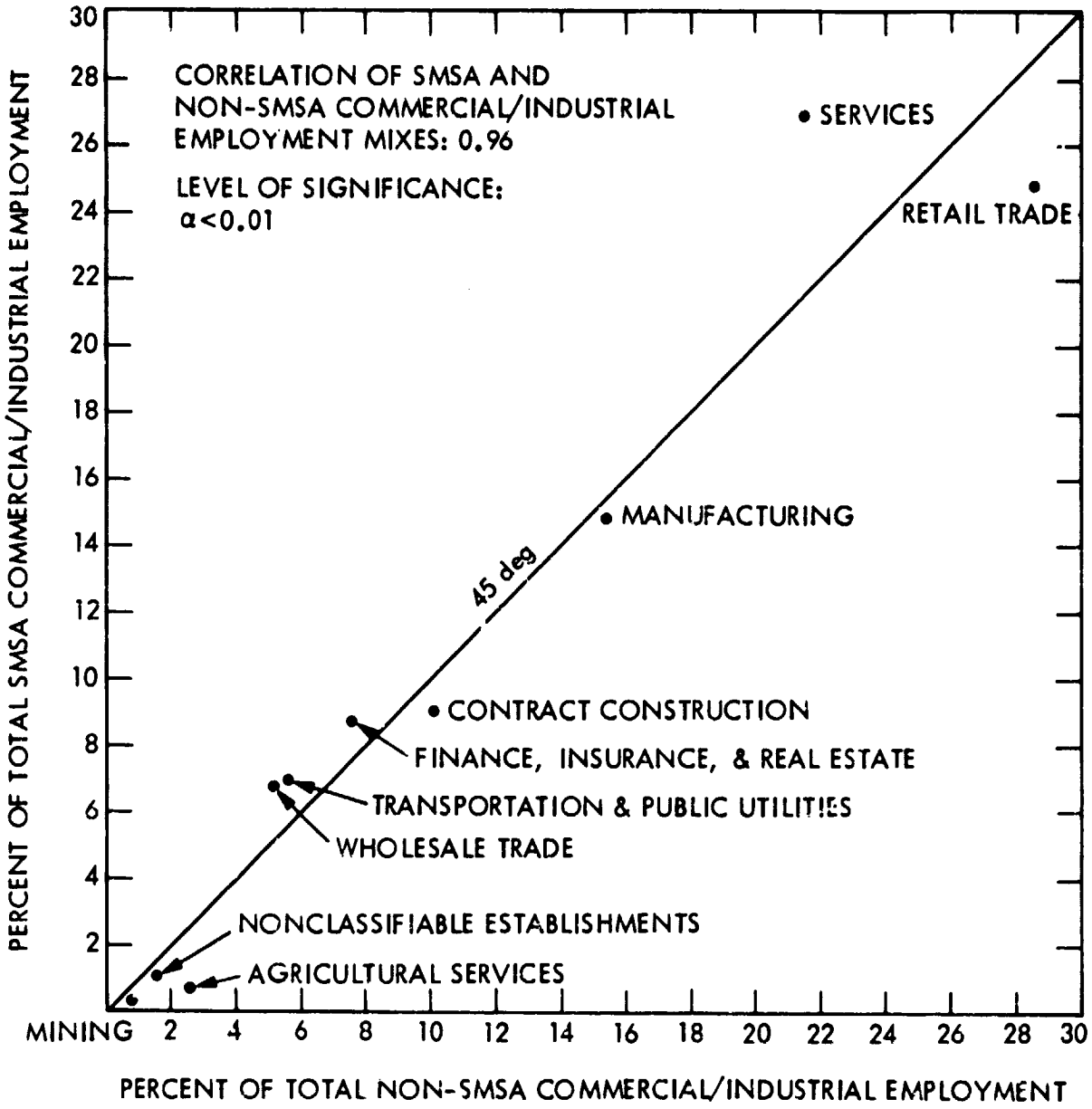

Figure D-3. Percentage Mix of SMSA versus Non-SMSA Commercial/ Industrial Employment, Florida, 1981

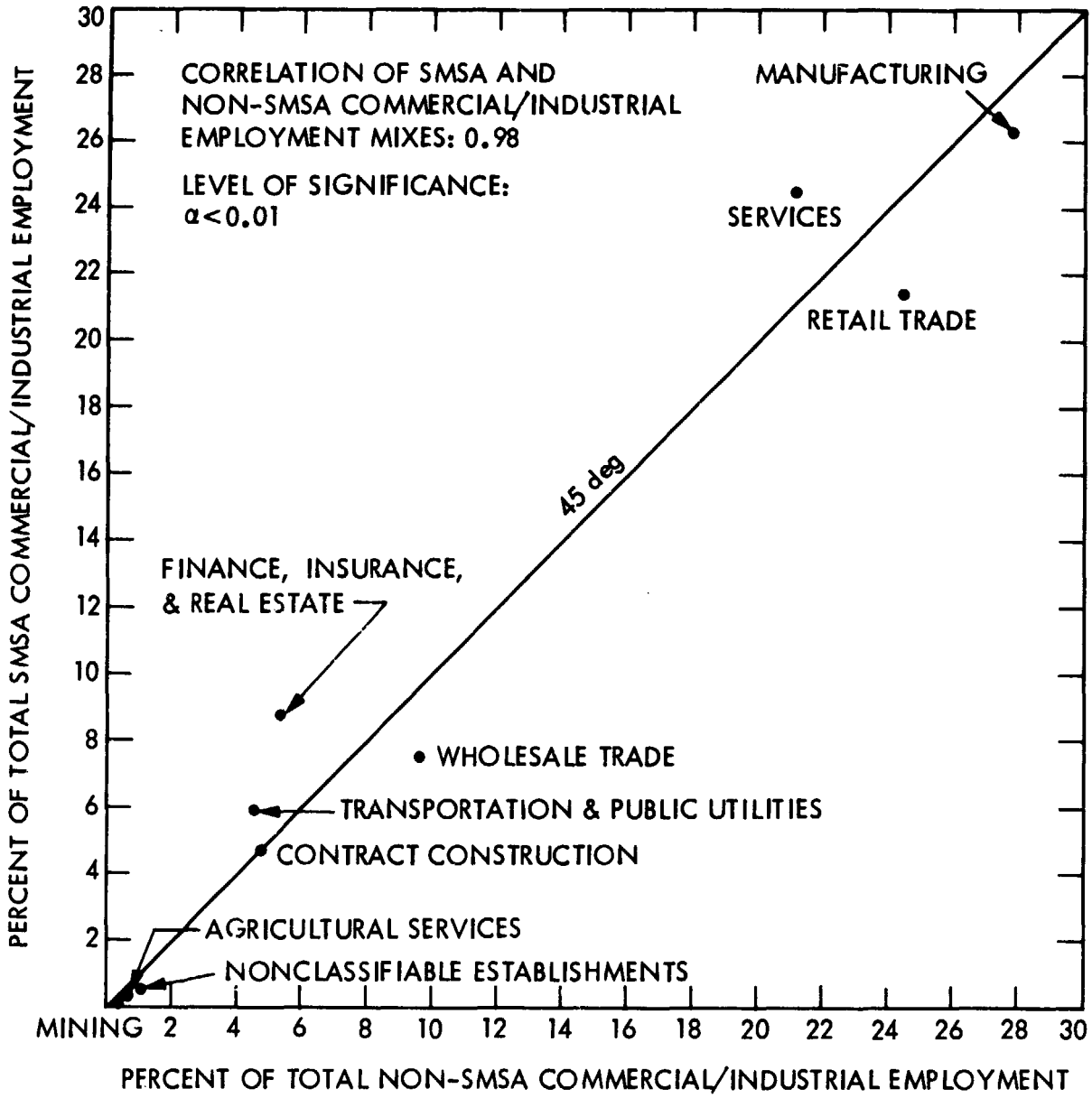

Figure D-4. Percentage Mix of SMSA versus Non-SMSA Commercial/ Industrial Employment, Iowa, 1981

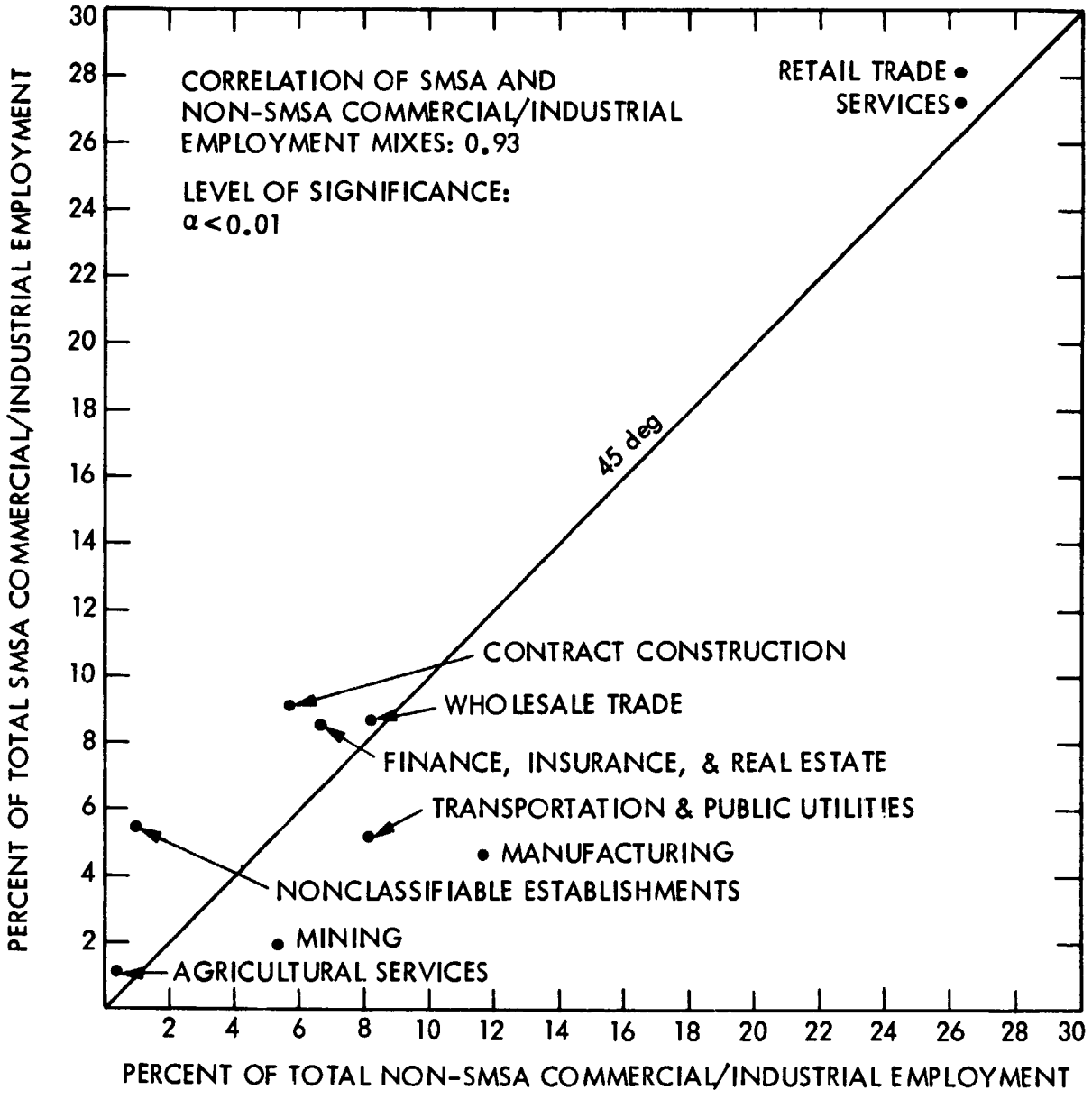

Figure D-5. Percentage Mix of SMSA versus Non-SMSA Commercial/ Industrial Employment, Montana, 1981

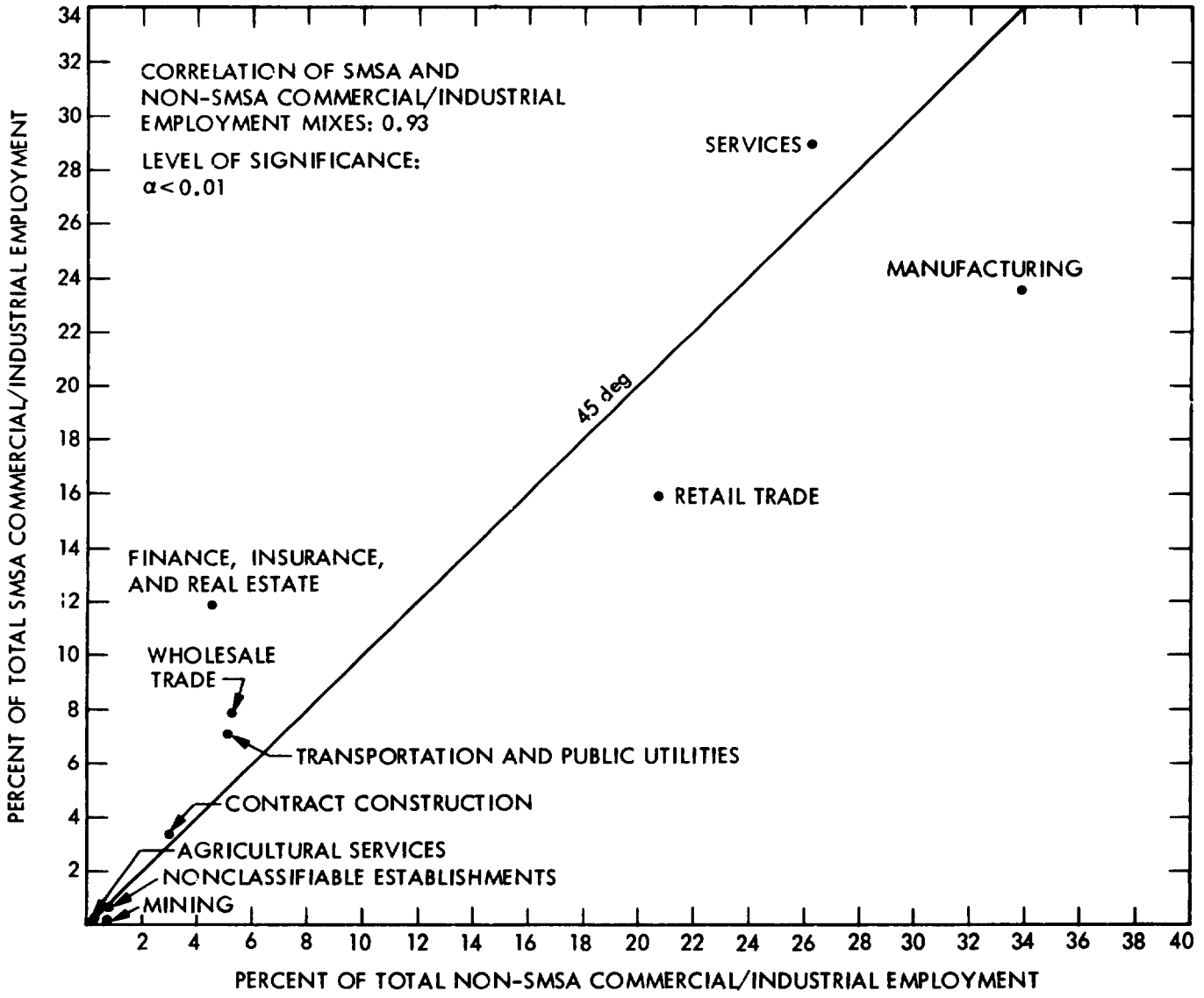

Figure D-6. Percentage Mix of SMSA versus Non-SMSA Commercial/ Industrial Employment, New York, 1981

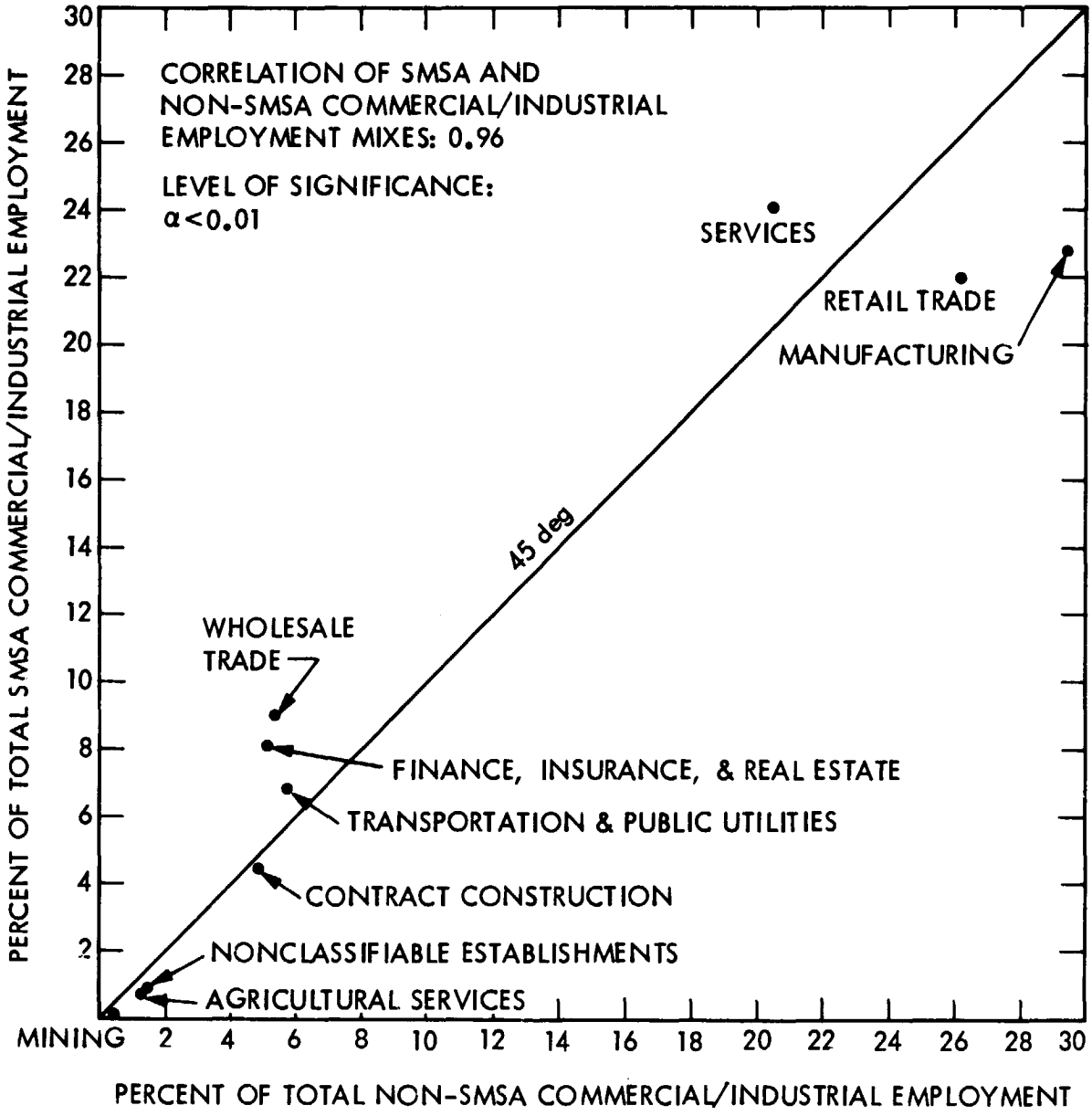

Figure D-7. Percentage Mix of SMSA versus Non-SMSA Commercial/ Industrial Employment, Oregon, 1981

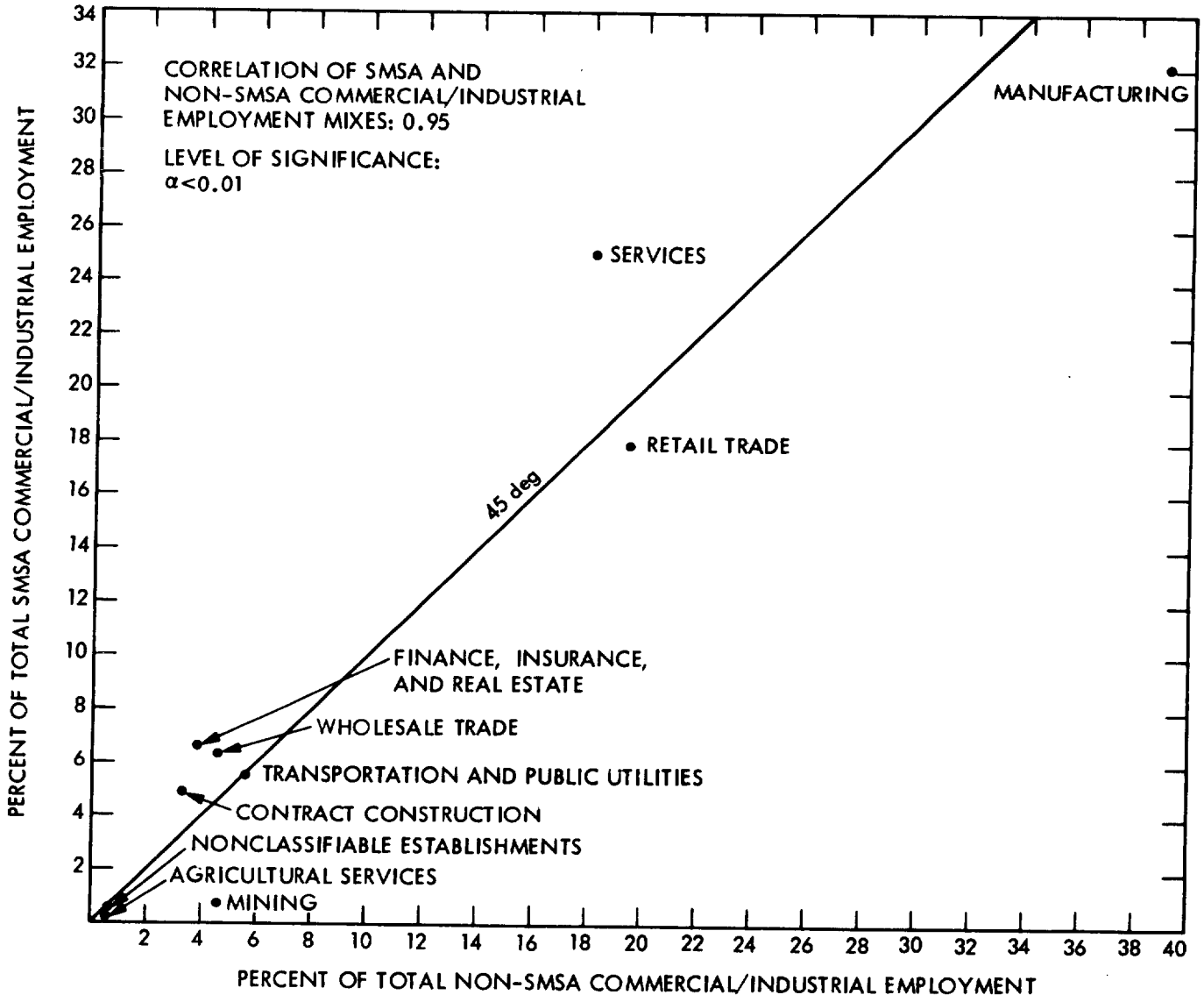

Figure D-8. Percentage Mix of SMSA versus Non-SMSA Commercial/ Industrial Employment, Pennsylvania, 1981

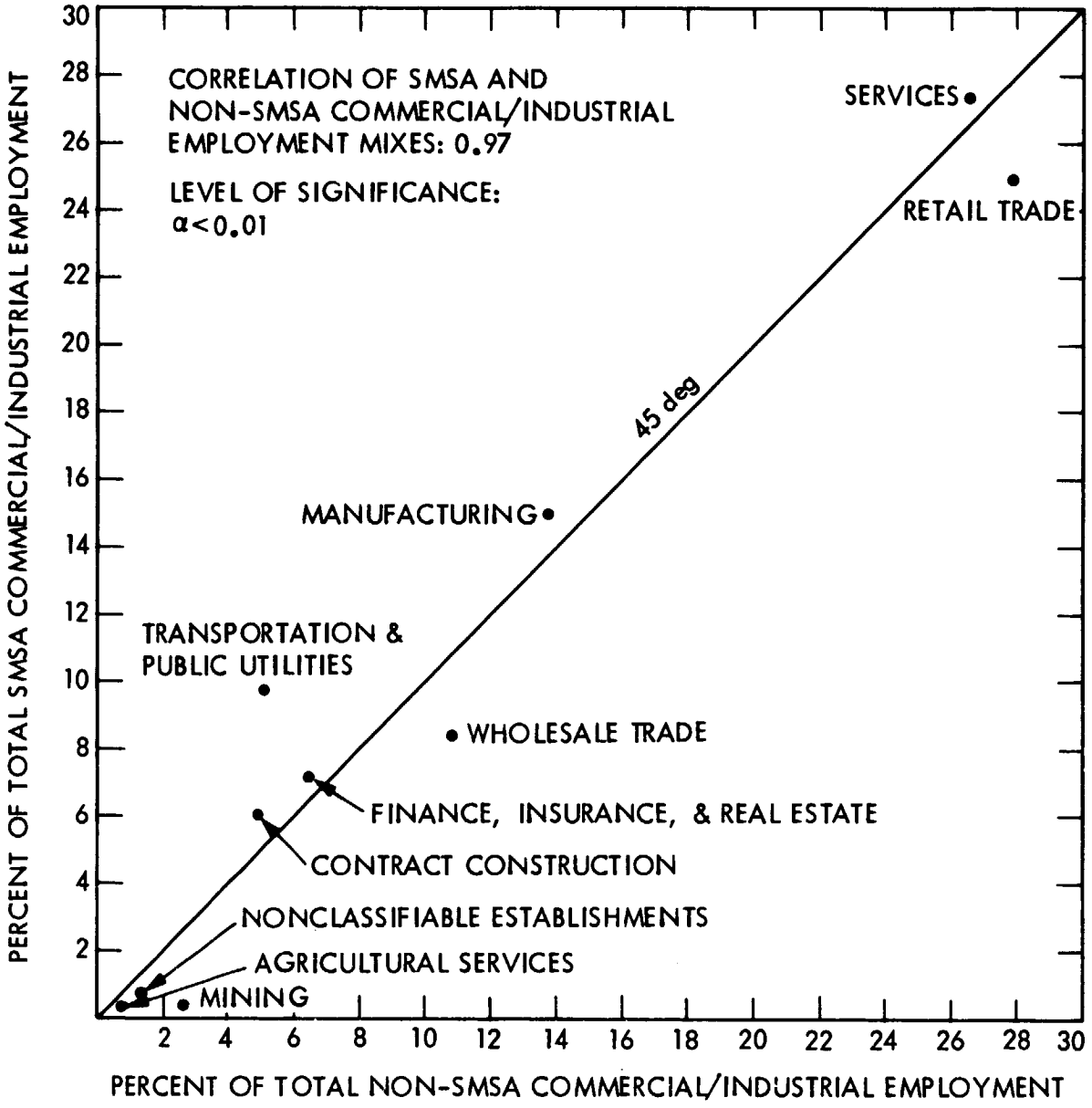

Figure D-9. Percentage Mix of SMSA versus Non-SMSA Commercial/ Industrial Employment, South Dakota, 1981

APPENDIX E

INDIVIDUAL SECTOR COMPARISON OF SMSA AND NON-SMSA LOCAL GOVERNMENTS

APPENDIX E

INDIVIDUAL SECTOR COMPARISON OF SMSA AND NON-SMSA LOCAL GOVERNMENTS

Similar to commercial/industrial activity, the variations between proportionate shares of SMSA and non-SMSA government activity in the nine states that were analyzed fall into four categories: (1) variation without a clearly definable pattern, (2) similar proportionate shares, (3) consistently higher non-SMSA proportionate shares, and (4) consistently higher SMSA proportionate shares. These category distinctions were based on the statistical analysis of variance shown in Table E-1.

A. GOVERNMENT SERVICE SECTORS LACKING DISTINCT SMSA VERSUS NON-SMSA PATTERNS OF SIMILARITY OR VARIANCE

1. Local Utilities

As shown in Figure E-1, "Local Utilities" employment does not exhibit a clear pattern of variation between SMSA and non-SMSA areas across the nine states that were analyzed.[1] However, nationwide, SMSA and non-SMSA areas have nearly equal proportionate shares -- 2.6 and 2.8%, respectively -- of their local government employment in this sector (see Table E-2). Therefore, at least from the viewpoint of the country as a whole, the data indicate that SMSA and non-SMSA areas have substantially the same proportionate share of "Local Utility" government user classes meeting the FCC's definition of "Industrial - Power and Special Industrial" activities.

2. Income Maintenance

As with "Local Utilities," "Income Maintenance" does not exhibit a distinct pattern of similarity or dissimilarity between SMSA and non-SMSA areas (see Figure E-2). However, at the national level (see Table E-2) non-SMSA areas have a smaller proportionate share (1.9%) of "Income Maintenance" employment than SMSA areas (2.7%). Because "Income Maintenance" activity is only eligible under the FCC "Public Safety - Local Government" sub-category (i.e., the sub-category that encompasses almost all local government functions), the available data for this sector does not directly substantiate the potential size of any user-specific FCC sub-category.

B. GOVERNMENT SERVICE SECTORS WITH SIMILAR SMSA AND NON-SMSA PROPORTIONATE SHARES OF EMPLOYMENT

Non-SMSA and SMSA areas have similar shares of employment in two sectors of the nine states that were analyzed: "Education" and "Other" (see Figures E-3 and E-4, and Table E-2).

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[1]Figures E-1 through E-13 are based on the data in Table E-2.

1. Education

As shown in Figure E-3, "Education," the largest local government sector, has closely similar proportions of local government employment in SMSA and non-SMSA areas: only in Florida, New York, and Pennsylvania does the difference between the two areas' proportionate employment shares exceed two percentage points. Nationwide, "Education" constitutes 52.6 and 59.8% of SMSA and non-SMSA local government employment, respectively (see Table E-2). In terms of the FCC categories presented in Table B-1, these data indicate that state non-SMSA areas have a proportionately equal or slightly larger "Special Emergency - School Buses" user class than SMSA areas.

2. Other

The proportion of "Other" local governmental activity in SMSA and non-SMSA areas is similar in all of the states analyzed except Alaska (see Figure E-4). Nationwide, this sector constitutes 4.9 and 3.4% of local government employment in SMSAs and non-SMSAs, respectively. Similar to the "Income Maintenance" sector discussed above, this sector does not coincide with any specific user class of private land mobile radio except the broad-based "Public Safety - Local Government" sub-category.

C. GOVERNMENT SERVICE SECTORS CONSTITUTING A LARGER PROPORTIONATE SHARE OF NON-SMSA EMPLOYMENT THAN SMSA EMPLOYMENT

Non-SMSA areas, in comparison to SMSA areas, have a larger proportionate share of local government employment in three sectors: "Hospitals and Health," "Highways," and "Government Administration." As mentioned above, the first two of these sectors directly coincide with the FCC "Special Emergency - Medical Services" and "Public Safety - Highway Maintenance" sub-categories, while "Government Administration" is subsumed under the broadly defined "Public Safety - Local Government" sub-category.

1. Hospitals and Health

As shown in Figure E-5, non-SMSA areas, relative to SMSA areas, have a higher proportionate share of "Hospitals and Health" employment in six of the nine states that were analyzed. Nationwide, this sector employs the second largest proportion (10.1%) of local government workers in non-SMSA areas and the third largest proportion (7.4%) of SMSA local government workers (see Table E-2). In terms of the FCC sub-categories, these employment figures indicate that non-SMSAs have a proportionately larger "Public Safety - Medical Emergency" user class than SMSA areas. [The actual level of non-SMSA "Hospitals and Health" employment may be substantially higher than that indicated by local government data alone because state government composes 49.5% of non-federal employment in the "Hospitals and Health" sector (see Table 4-3).]

2. Highways

In the "Highways" sector of all nine states, the proportionate share of non-SMSA employment exceeds the proportionate share of SMSA employment (see Figure E-6). This same pattern exists at the national level where the respective SMSA and non-SMSA shares of local government "Highways" employment are 3.1 and 5.5%, respectively. Similar to the "Hospitals and Health" sector, state government contains a large portion (i.e., 47%) of overall non-federal employment in this sector. Because "...many state governments restrict their responsibilities for public roads to those areas outside of incorporated municipalities," (Bonifant, 1984) the proportionate share of non-federal government employment in the "Highways" sector may be significantly higher in non-SMSA areas than in SMSA areas. In terms of private land mobile radio service, the data indicate that the FCC "Public Safety - Highway Maintenance" user class comprises a larger proportion of potential land mobile radio users in non-SMSA areas than in SMSA areas.

3. Government Administration

Figure E-7 shows that the proportionate share of non-SMSA local government employment in "Government Administration" exceeds the SMSA share by more than a percentage point in five of the nine states; in the remaining four states, the proportionate shares of the two areas are nearly the same. At the national level, "Government Administration" constitutes 5.5 and 6.2% of SMSA and non-SMSA local government employment, respectively. Because the Census' "Government Administration" sector represents just one component of the broad-based "Public Safety - Local Government" user class, it is difficult to distinguish between the proportionate size of SMSA and non-SMSA user classes represented by this radio service sub-category.

D. GOVERNMENT SERVICE SECTORS CONSTITUTING A SMALLER PROPORTIONATE SHARE OF NON-SMSA EMPLOYMENT THAN SMSA EMPLOYMENT

Non-SMSA areas have a smaller proportionate share of local government employment in six sectors: "Police and Fire," "Environment," "Other Transportation," "Corrections," "Housing and Urban Renewal," and "Transit." The latter four sectors represent user classes that are defined only under the FCC "Public Safety - Local Government" sub-category. The remaining two sectors, "Police and Fire" and "Environment," coincide relatively closely with the FCC "Public Safety - Police, Fire and Forestry-Conservation" sub-categories; however, as mentioned in Appendix B, some "Fire" sector functions have eligibility for land mobile radio service in the "Special Emergency - Rescue Organizations" sub-category.

1. Police and Fire

SMSA areas have a higher proportion of their local government employment in "Police and Fire" than non-SMSA areas. As indicated in Figure E-8, the SMSA proportion of employment in this sector exceeds the non-SMSA proportion in all of the states that were analyzed except Alaska. Nationwide,

the "Police and Fire" sector constitutes 10.4% of SMSA local government employment and 6.2% of non-SMSA local government employment. The actual difference between the two areas in this sector is somewhat smaller because non-SMSA areas have proportionately much higher levels of firefighter volunteers than SMSA areas.[2]

2. Environment

"Environment" constitutes a greater proportionate share of employment in SMSA areas than in non-SMSA areas (see Figure E-9). However, the local government data for this sector do not adequately represent the proportionate sizes of SMSA and non-SMSA government user classes of private land mobile radio.

As shown in Table E-3, the "Natural Resources" component of the "Environment" sector is proportionately larger in non-SMSA areas than in SMSA areas. Moreover, while "Natural Resources" activity constitutes less than one-half of one percent of local government employment, it composes the entire 5.3% share of state government "Environment" employment -- a level of employment nearly equal to the number of local government "Environment" workers in SMSA areas (see Table E-4).[3] Therefore, in terms of the FCC sub-categories, non-SMSA areas probably have a proportionately larger "Public Safety - Forestry Conservation" user class than SMSA areas even though local government data alone suggest the opposite.

3. Other Transportation, Corrections, Housing and Urban Renewal, and Transit

As shown in Figures E-10 through E-13 and in Table E-2, SMSA areas have larger proportions of their local government employment in the "Other Transportation," "Corrections," "Housing and Urban Renewal," and "Transit" sectors than non-SMSA areas in all nine states except Alaska. Nationwide, these four sectors combined constitute less than 3.2% of the local government employment in non-SMSA areas. On the other hand, SMSA areas at the national level have 8.2% of their local government employment in these four sectors. Of the four sectors, "Housing and Urban Renewal" and "Transit" make up 80% of the difference between the two areas. Because all four of these sectors only

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[2]Because the data are based on full-time employment equivalents, the proportion of overall non-SMSA local government workers providing Fire Protection services is less than the equivalent proportion in SMSA areas because of the greater propensity for volunteers in non-SMSA areas as opposed to SMSA areas (i.e., the ratios of full to part-time firefighters in non-SMSA and SMSA areas are 1.2:1 and 6:1, respectively).

[3]By definition, state "Natural Resource" services consist of land-intensive, predominantly non-SMSA activities (e.g., forest fire prevention and control; irrigation; land and forest reclamation; fish and game preservation and control; soil conservation; forestry; agricultural aids; mineral resource activities; and state government park and recreation activities).

represent potential private land mobile radio users under the "Public Safety - Local Governments" sub-category, they do not constitute major user-specific classes by themselves. Therefore, even though the SMSA and non-SMSA proportionate share of employment activity in these four sectors differ, the differences do not represent a significant divergence between the two areas in terms of the proportionate size of user-specific private land mobile radio user classes.

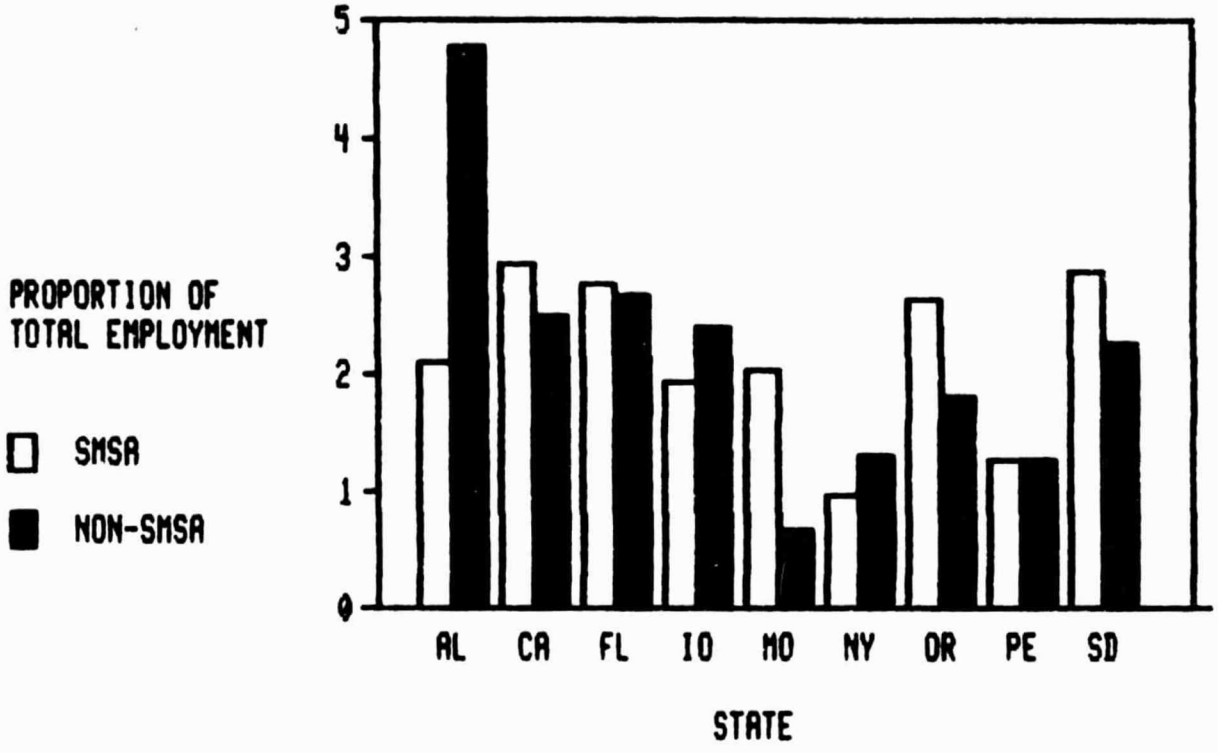

Figure E-1. SMSA versus Non-SMSA Government Employment - Local Utilities, 1977

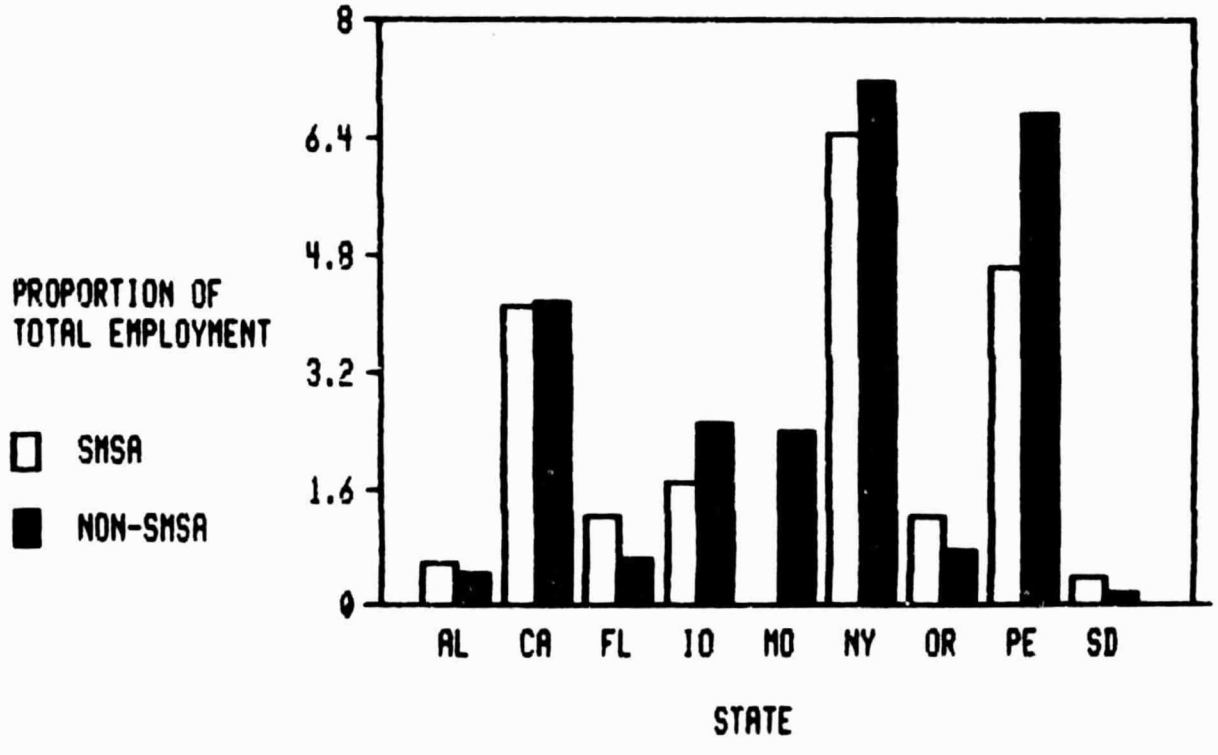

Figure E-2. SMSA versus Non-SMSA Government Employment - Income Maintenance, 1977

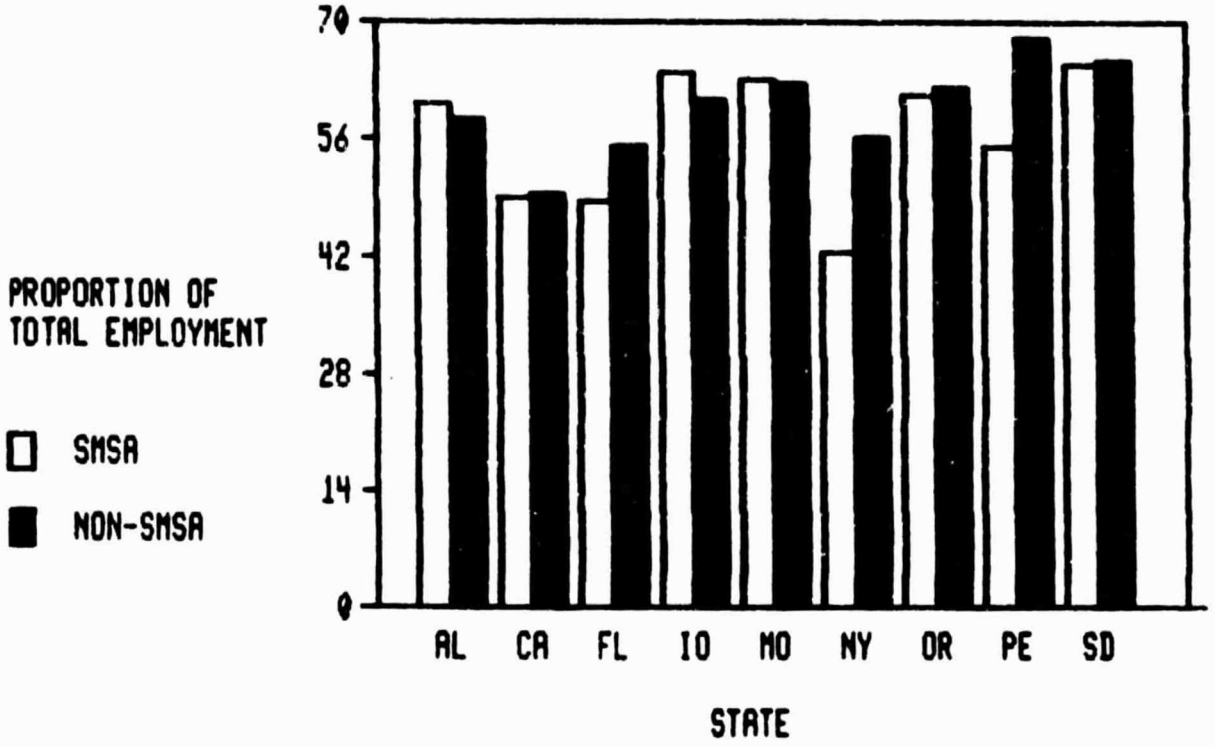

Figure E-3. SMSA versus Non-SMSA Government Employment - Education, 1977

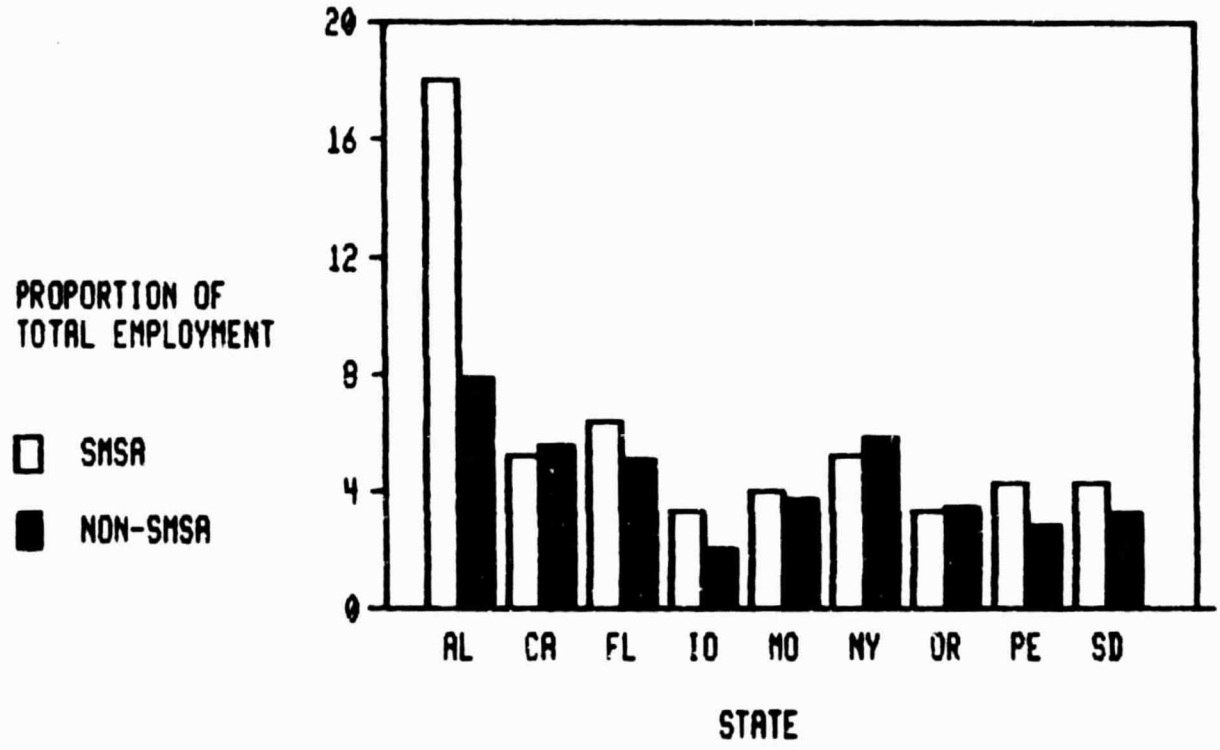

Figure E-4. SMSA versus Non-SMSA Government Employment - Other, 1977

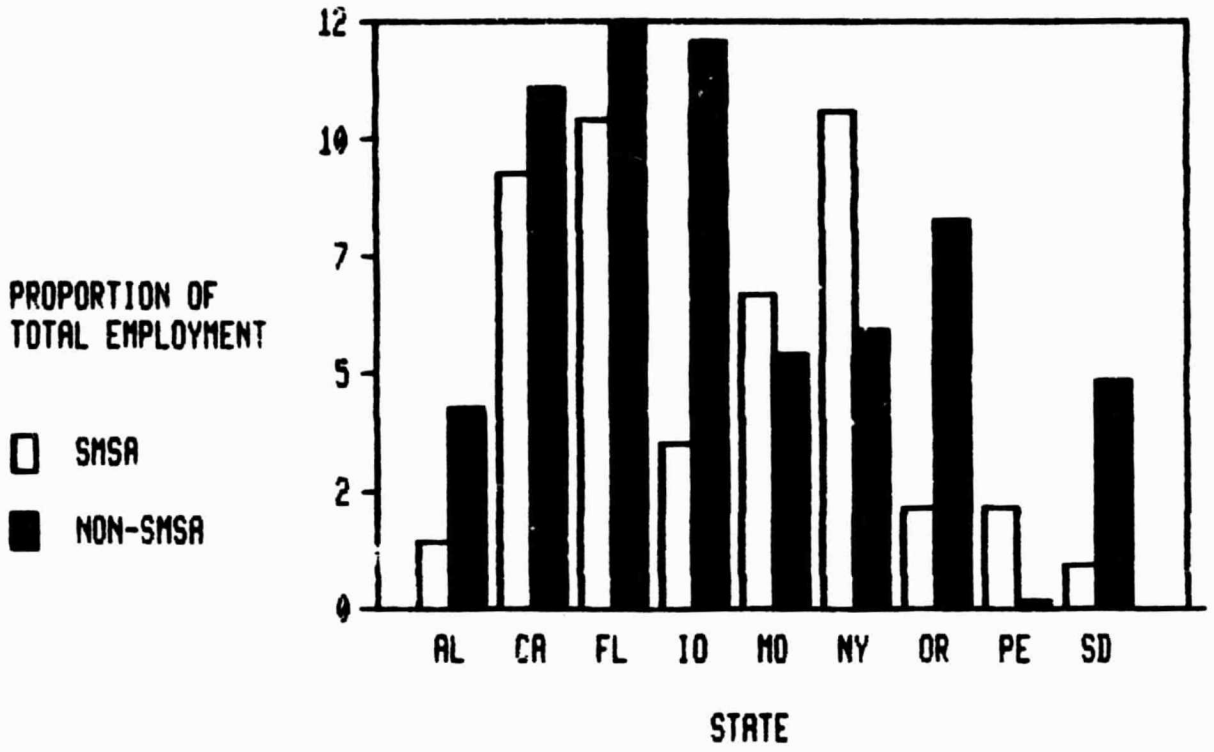

Figure E-5. SMSA versus Non-SMSA Government Employment - Health & Hospitals, 1977

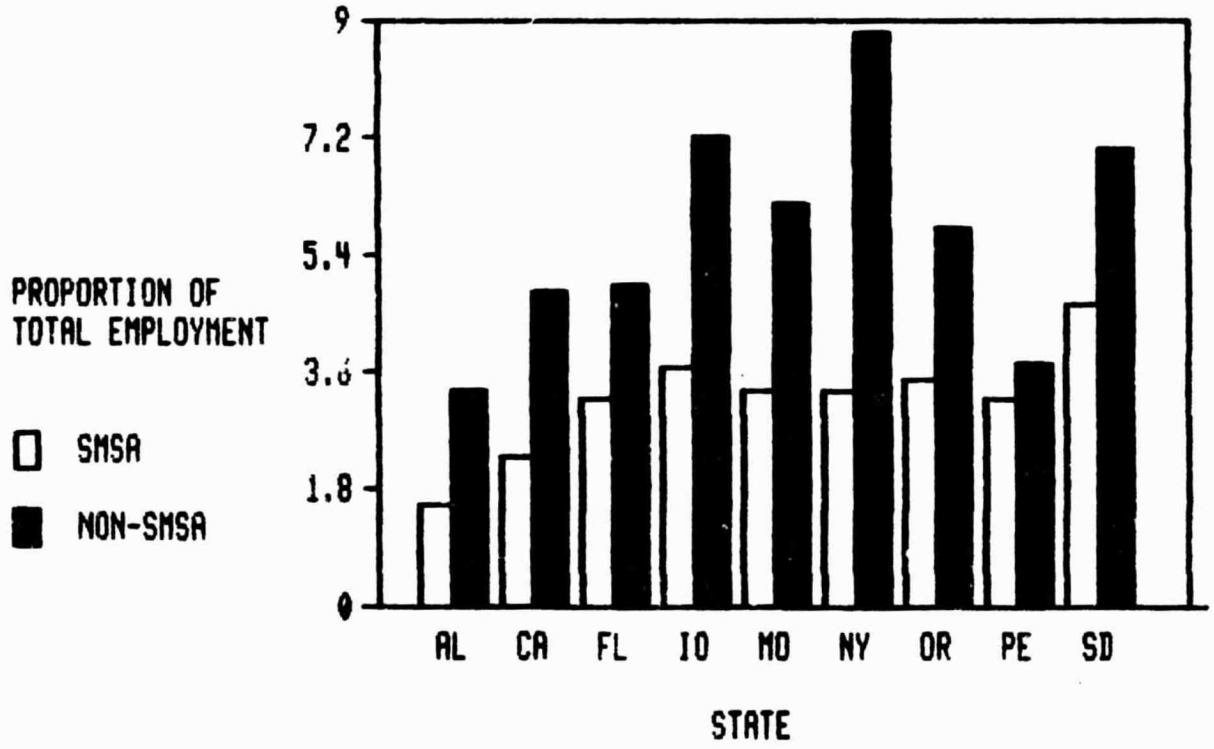

Figure E-6. SMSA versus Non-SMSA Government Employment - Highways, 1977

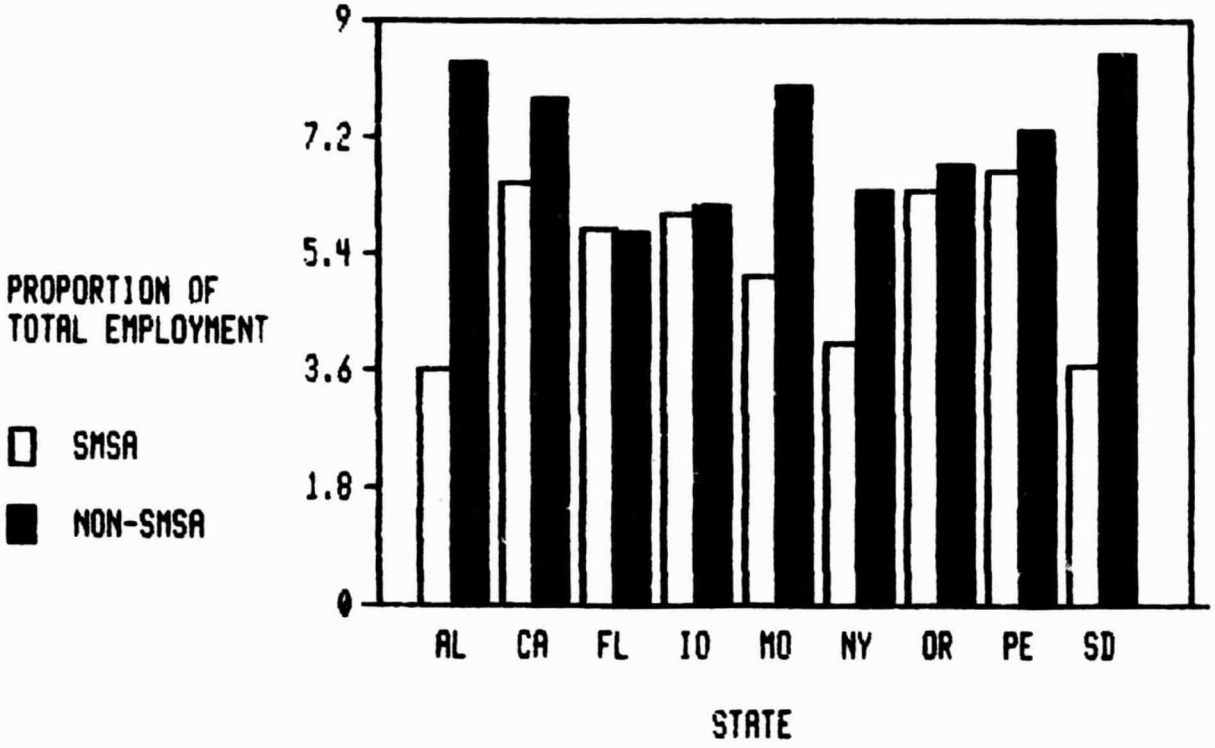

Figure E-7. SMSA versus Non-SMSA Government Employment - Government Administration, 1977

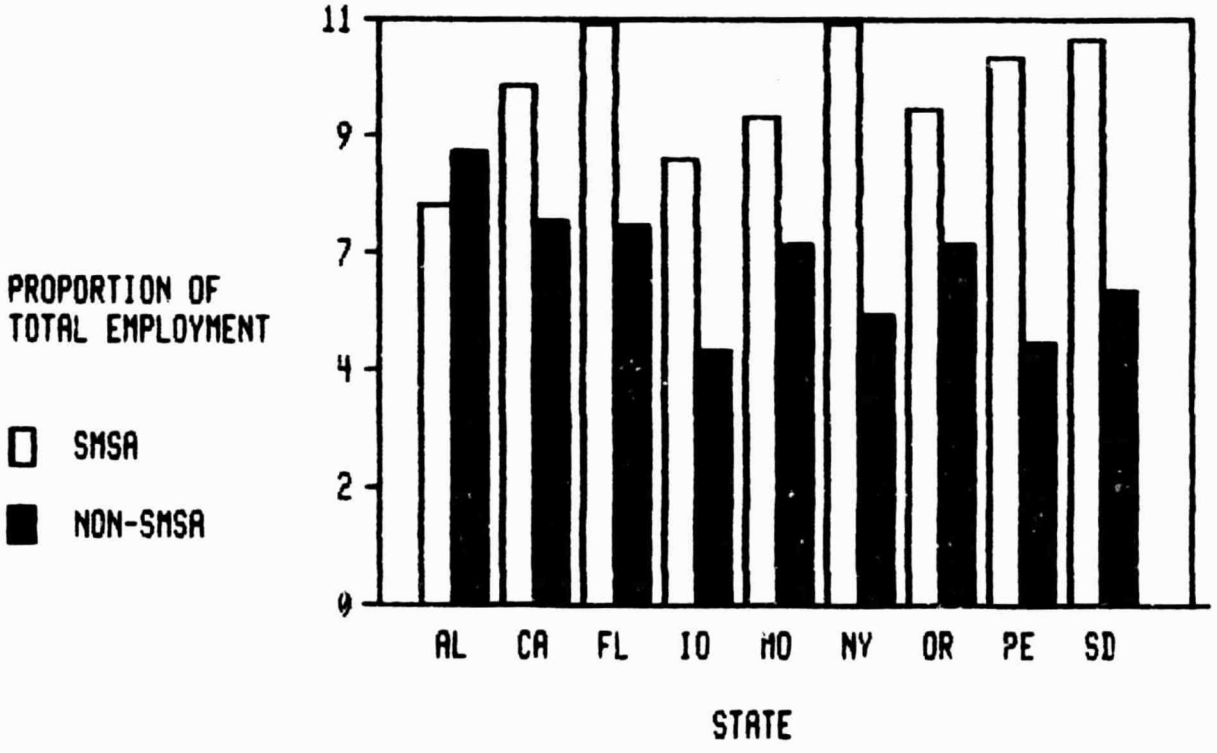

Figure E-8. SMSA versus Non-SMSA Government Employment - Police & Fire, 1977

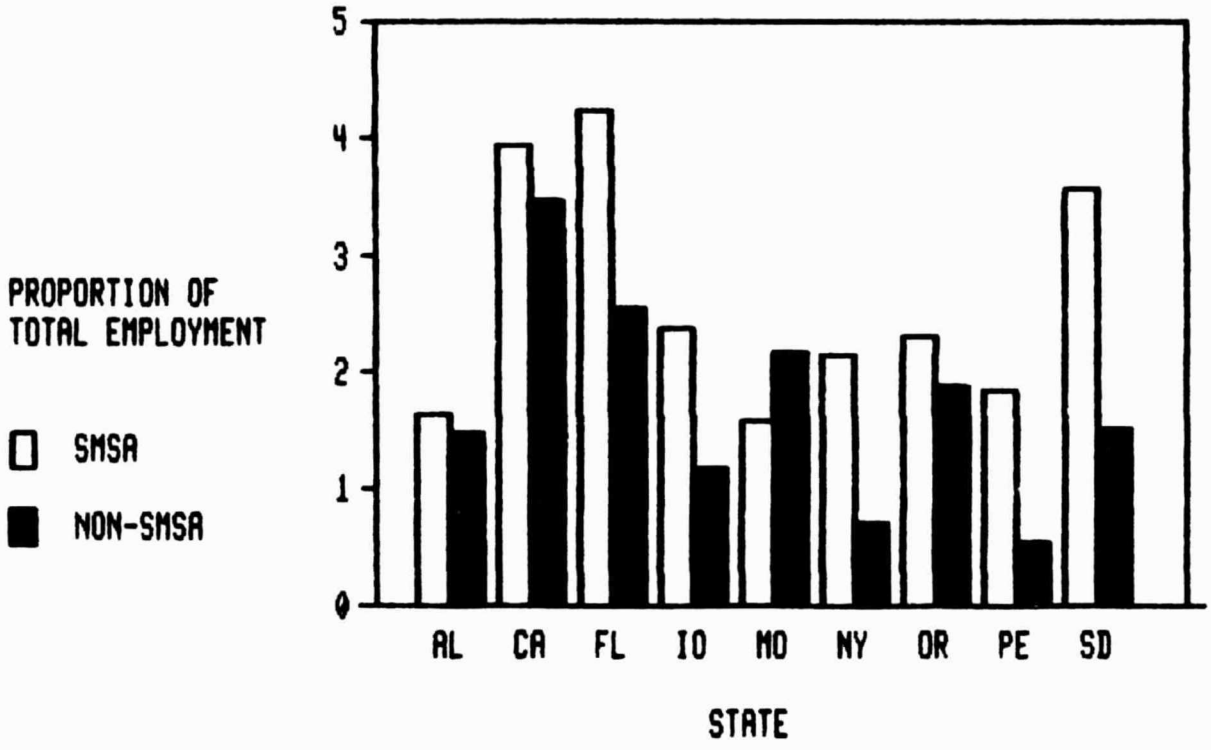

Figure E-9. SMSA versus Non-SMSA Government Employment - Natural Resources, 1977

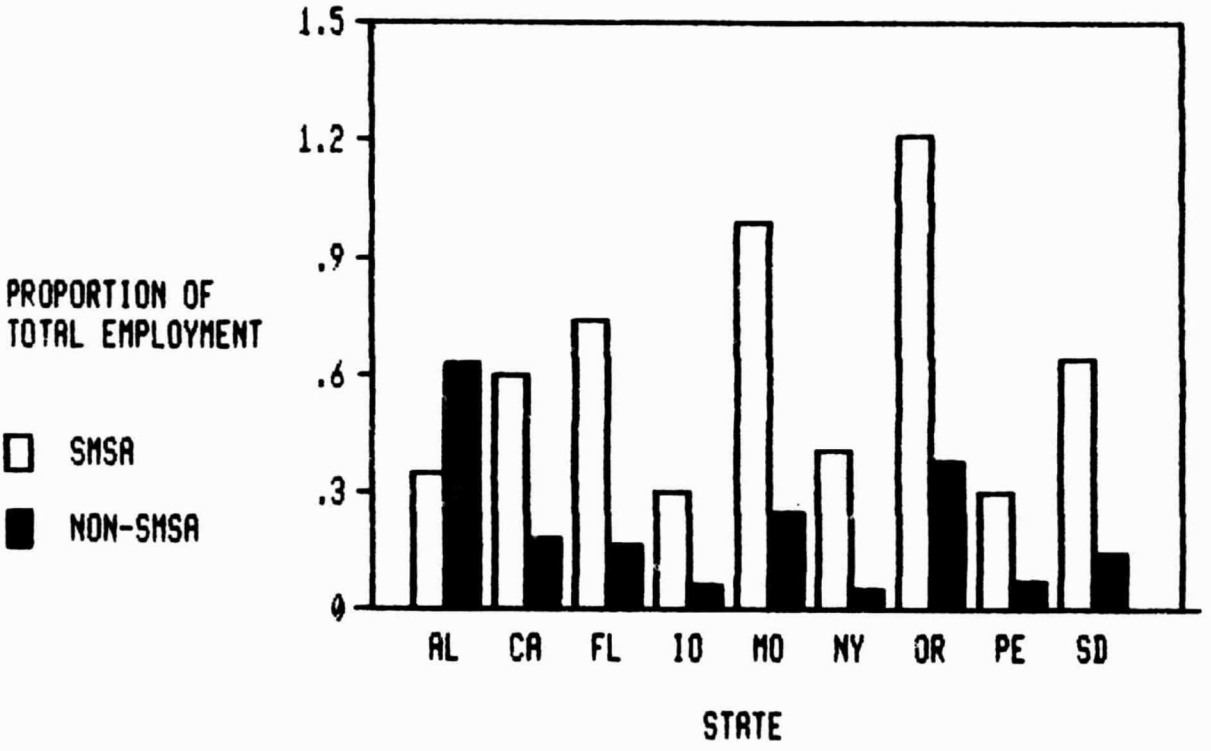

Figure E-10. SMSA versus Non-SMSA Government Employment - Other Transportation, 1977

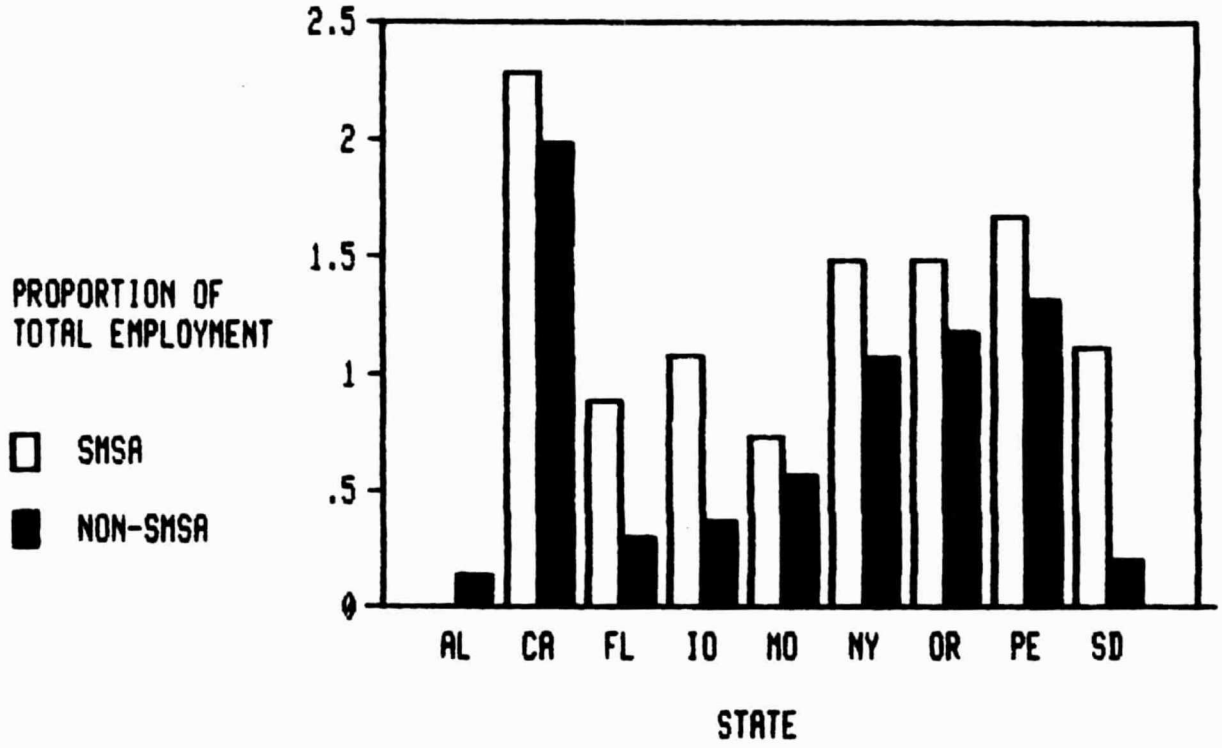

Figure E-11. SMSA versus Non-SMSA Government Employment - Corrections, 1977

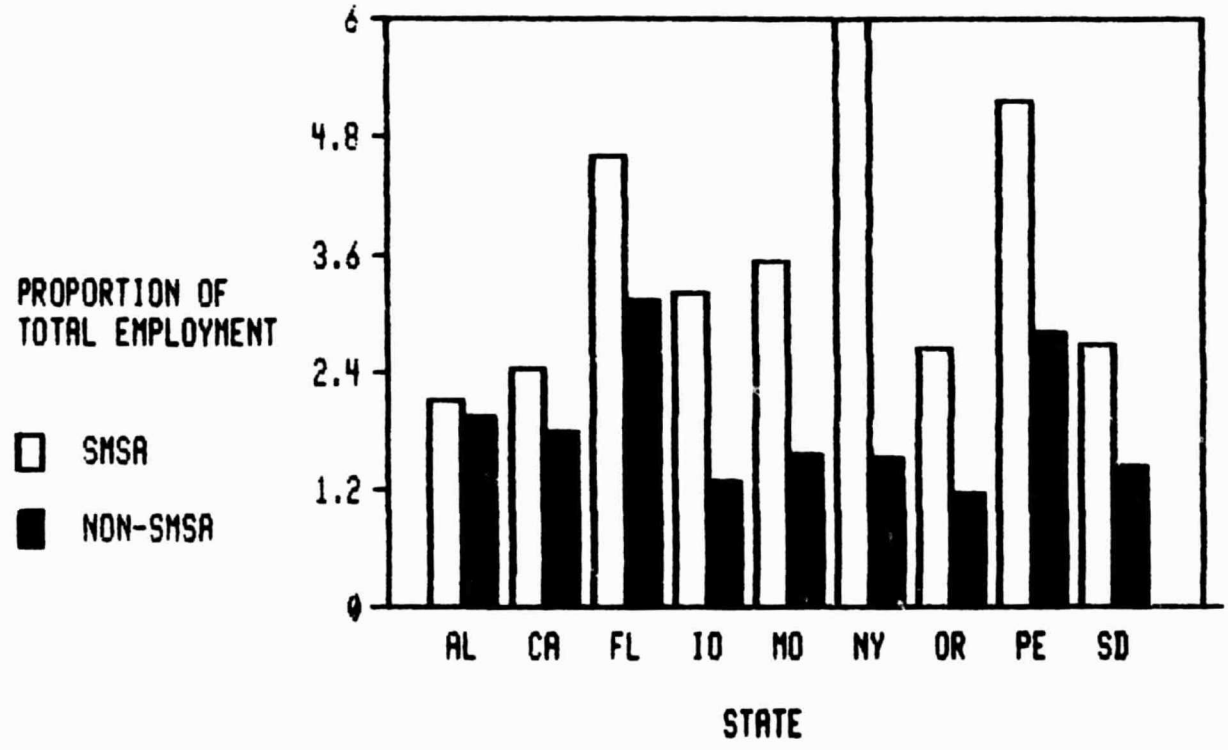

Figure E-12. SMSA versus Non-SMSA Government Employment - Housing & Urban Renewal, 1977

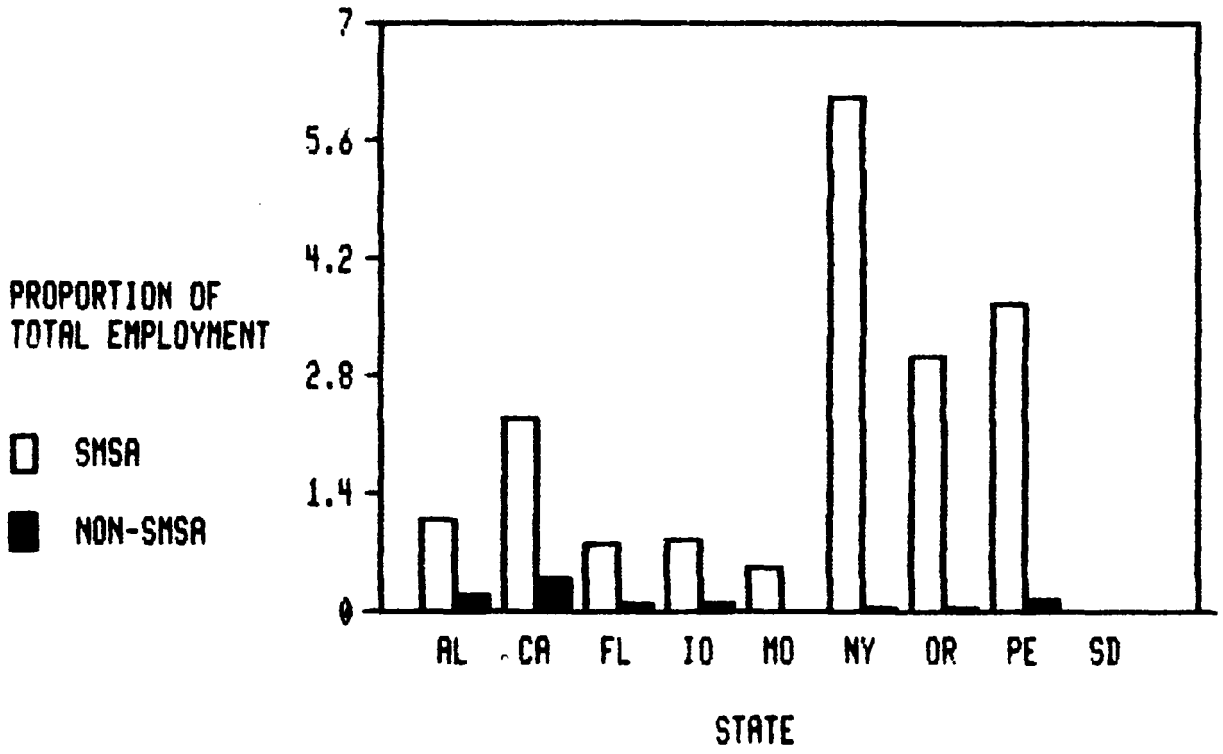

Figure E-13. SMSA versus Non-SMSA Government Employment - Transit, 1977

Table E-1. Government Service Two-Factor Analysis of Variance[a]

EMPLOYMENT CATEGORY	TREATMENTS SUM OF SQUARES	BLOCKS SUM OF SQUARES	ERROR SUM OF SQUARES	TOTAL SUM OF SQUARES	MEAN SQUARE TREATMENTS	MEAN SQUARE BLOCKS	MEAN SQUARE ERROR	$F=\frac{MST}{MSE}$ (b)	$F=\frac{MSB}{MSE}$ (c)
Education	50.47	607.29	156.48	814.23	50.47	75.91	19.56	2.58	3.88(d)
Hospitals and Health	16.55	188.98	62.64	268.17	16.55	23.62	7.83	2.11	3.02
Income Maintenance	1.18	93.75	4.68	99.61	1.18	11.72	0.59	2.01	20.02(e)
Highways	30.08	23.22	7.64	60.94	30.08	2.90	0.95	31.52(e)	3.04
Other Transportation	0.73	0.68	0.43	1.83	0.73	0.08	0.05	13.62(e)	1.58
Police and Fire	48.48	7.19	16.01	71.68	48.48	0.90	2.00	24.22(e)	0.45
Corrections	0.72	6.08	0.39	7.19	0.76	0.72	0.05	14.72(e)	15.63(e)
Environment	3.68	12.30	2.86	18.84	3.68	1.54	0.36	10.29(d)	4.30(d)
Housing & Urban Renewal	14.10	12.67	6.51	33.28	14.10	1.58	0.81	17.32(e)	1.94
Government Administration	16.47	6.12	14.17	36.76	16.47	0.76	1.77	9.30(d)	0.43
Local Utilities	0.00	9.80	5.27	15.07	0.00	1.22	0.66	0.00	1.86
Transit	16.65	15.54	15.27	47.45	16.65	1.94	1.91	8.72(d)	1.02
Other	11.41	153.18	43.22	207.81	11.41	19.15	5.40	2.11	3.54(d)

[a] Derived from Table E-2 data.

(b) F Statistic for Variations explained by SMSA vs. non-SMSA location.

(c) F Statistic for Variations explained by individual state blocking factor.

(d) $.05 > \alpha > .01$

(e) $\alpha < .01$

Table E-2. Percentage Composition of SMSA and Non-SMSA Local Government Employment by Sector for the United States and Selected States, 1977[a]

EMPLOYMENT SECTOR	STATE																			
	UNITED STATES		ALASKA		CALIFORNIA		FLORIDA		IOWA		MONTANA		NEW YORK		OREGON		PENNSYLVANIA		SOUTH DAKOTA	
	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA	SMSA	Non-SMSA
Education	52.6	59.8	60.1	58.5	48.9	49.6	48.6	55.0	63.8	60.5	62.8	62.5	42.6	56.1	60.9	62.1	55.1	68.2	64.7	65.2
Hospitals & Health	7.4	10.1	1.4	4.1	8.9	10.6	10.0	12.6	3.4	11.6	6.4	5.2	10.2	5.7	2.0	7.9	2.1	0.2	0.9	4.6
Income Maintenance	2.7	1.9	0.6	0.4	4.1	4.1	1.2	0.6	1.7	2.5	0	2.4	6.5	7.1	1.2	0.8	4.6	6.7	0.4	0.1
Highways	3.1	5.5	1.5	3.3	2.3	4.8	3.2	4.9	3.6	7.2	3.3	6.2	3.3	8.8	3.5	5.8	3.2	3.7	4.6	7.0
Other Transportation	0.4	0.1	0.4	0.6	0.6	0.2	0.7	0.2	0.3	0.1	1.0	0.3	0.4	0.0	1.2	0.4	0.3	0.1	0.6	0.1
Police & Fire Protection	10.4	6.2	7.5	8.5	9.7	7.2	10.9	7.1	8.4	4.7	9.1	6.8	11.0	5.4	9.3	6.8	10.3	4.9	10.7	5.9
Correction	1.2	0.6	0	0.1	2.3	2.0	0.9	0.3	1.1	0.4	0.7	0.6	1.5	1.1	1.5	1.2	1.7	1.3	1.1	0.2
Environment	2.8	1.4	1.6	1.4	3.9	3.5	4.2	2.5	2.4	1.2	1.6	2.2	2.1	0.7	2.3	1.9	1.8	0.5	3.6	1.5
Housing & Urban Renewal	4.3	2.4	2.1	1.9	2.4	1.8	4.6	3.1	3.2	1.3	3.5	1.6	6.2	1.5	2.6	1.2	5.2	2.8	2.7	1.5
Government Administration	5.5	6.2	3.6	8.3	6.5	7.8	5.7	5.7	6.0	6.1	5.1	8.0	4.0	6.4	6.4	6.8	6.6	7.3	3.7	8.5
Local Utilities	2.4	2.3	2.1	4.8	2.9	2.5	2.8	2.7	1.9	2.4	2.0	0.7	1.0	1.3	2.6	1.8	1.3	1.3	2.9	2.3
Transit	2.2	0.1	1.1	0.2	2.3	0.4	0.8	0.1	0.8	0.1	0.5	0.0	6.1	0.0	3.0	0.0	3.6	0.1	0	0
Other	4.9	3.4	18.0	7.9	5.1	5.5	6.3	5.1	3.4	2.0	4.0	3.7	5.2	5.8	3.4	3.5	4.3	2.3	4.2	3.2

[a]Source: Derived from data in Table 13, Census of Governments - Compendium of Public Employment, 1977.

Table E-3. Non-SMSA versus SMSA Local Government Natural Resources and Local Parks and Recreation Employment, United States, 1977[a]

	Non-SMSA		SMSA	
	Number of Employees	Percent of Total Non-SMSA Employment	Number of Employees	Percent of Total SMSA Employment
Natural Resources	10,018	0.5	17,414	0.3
Local Parks and Recreation	17,899	0.9	139,451	2.5

[a]Source: Table 13, Census of Governments - Compendium of Public Employment, 1977.

Table E-4. State Government versus Local Government Natural Resources Employment, United States, 1977[a]

	Employment	Percent of Total Employment
State Governments	152,426	5.3
Local Governments	27,432	0.4

[a]Source: Table 13, Census of Governments - Compendium of Public Employment, 1977.

APPENDIX F

STATE-LEVEL COMPARISONS OF SMSA AND NON-SMSA LOCAL GOVERNMENT ACTIVITY MIXES

APPENDIX F

STATE-LEVEL COMPARISONS OF SMSA AND NON-SMSA LOCAL GOVERNMENT ACTIVITY MIXES

The graphs in this appendix depict the relationship between SMSA and non-SMSA mixes of local government activity in Alaska, California, Florida, Iowa, Montana, New York, Oregon, Pennsylvania, and South Dakota.

The vertical and horizontal axes in Figures D-1 to D-9 represent the respective percentages of SMSA and non-SMSA employment contained in each local government sector. The 45-deg line in each figure highlights the points on the graph where the percentage of total non-SMSA employment in a given local government sector equals the percentage of total SMSA employment in the same sector.

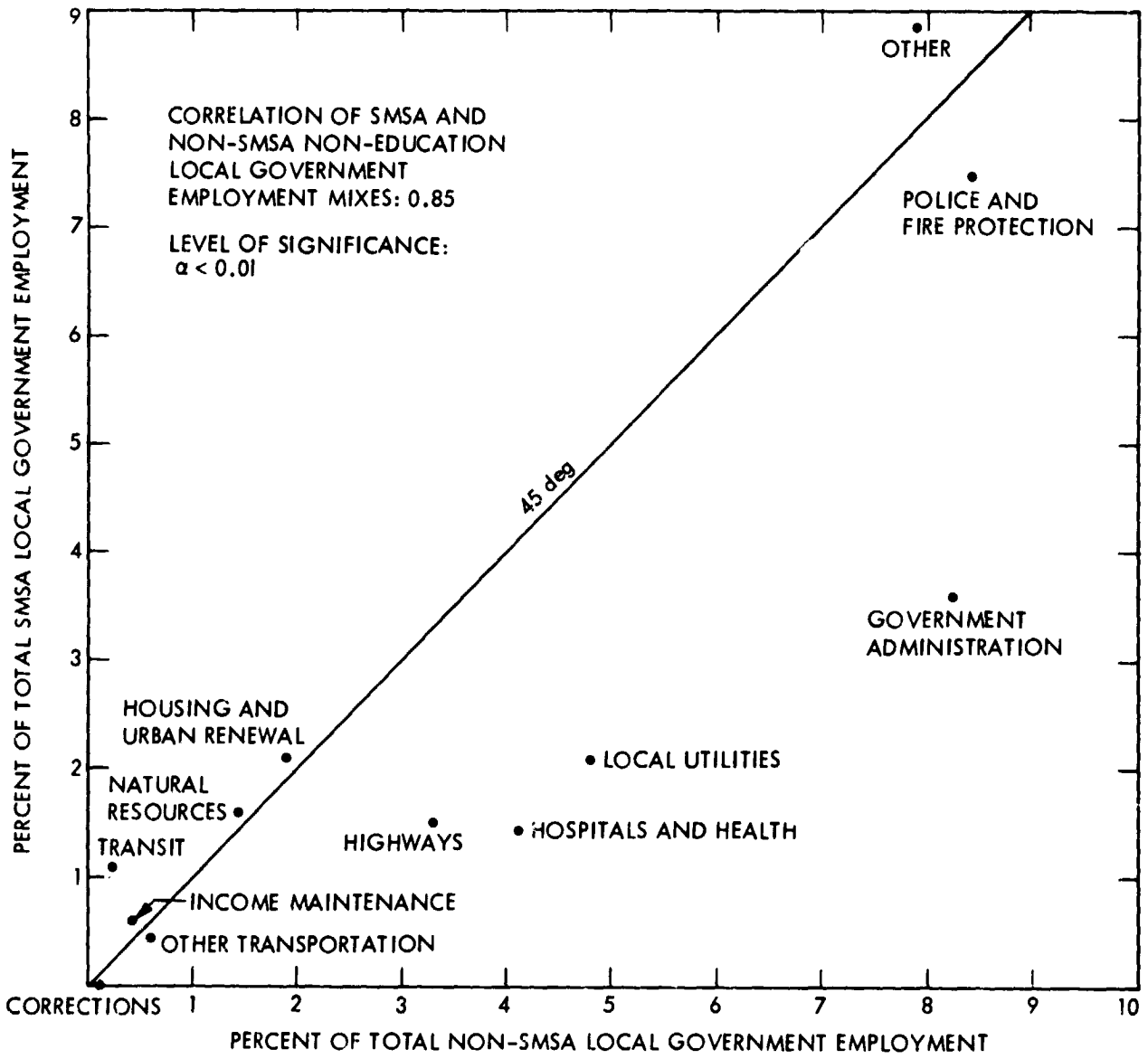

Figure F-1. Percentage Mix of SMSA versus Non-SMSA Local Government Employment, Alaska, 1977

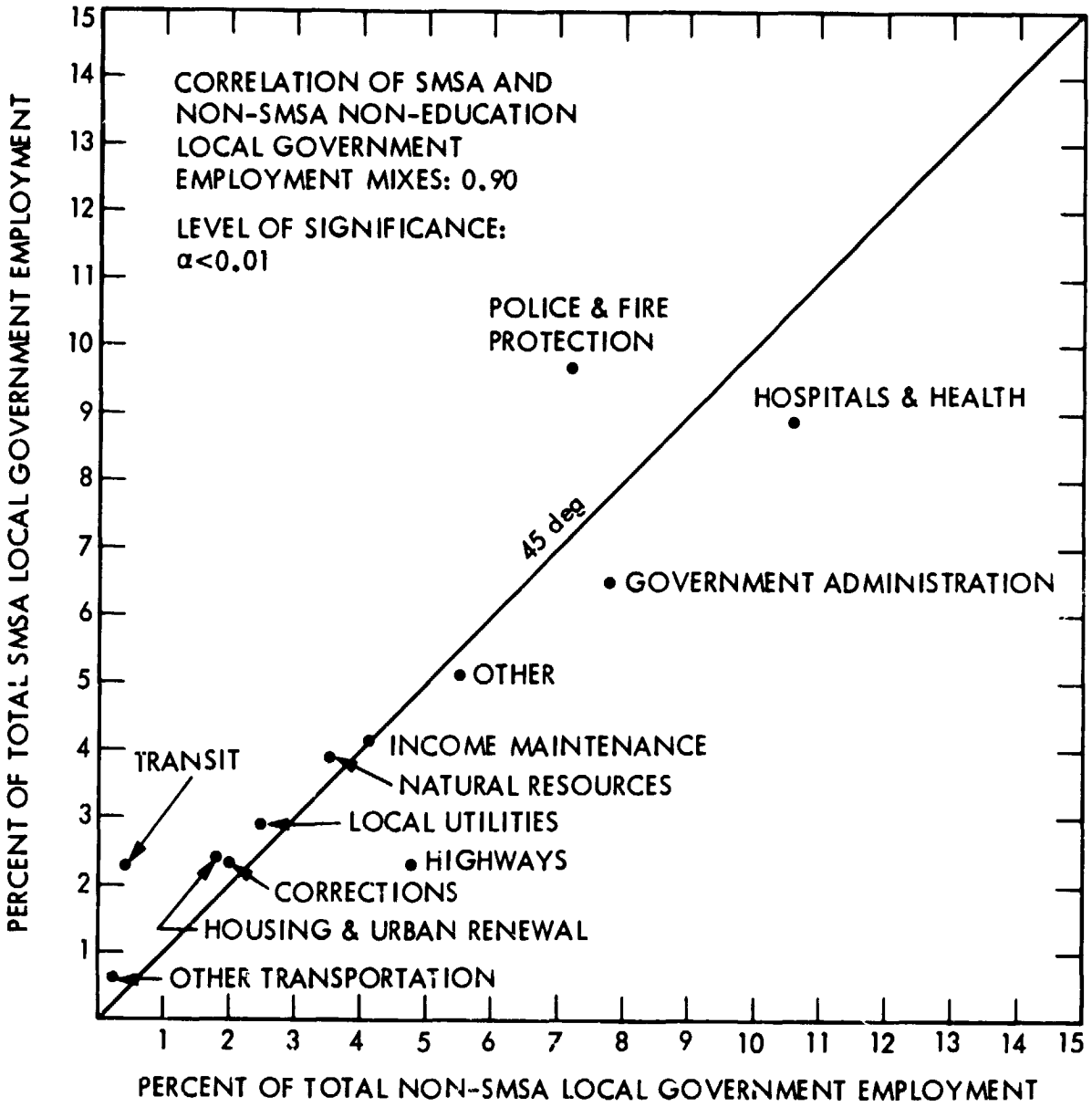

Figure F-2. Percentage Mix of SMSA versus Non-SMSA Local Government Employment, California, 1977

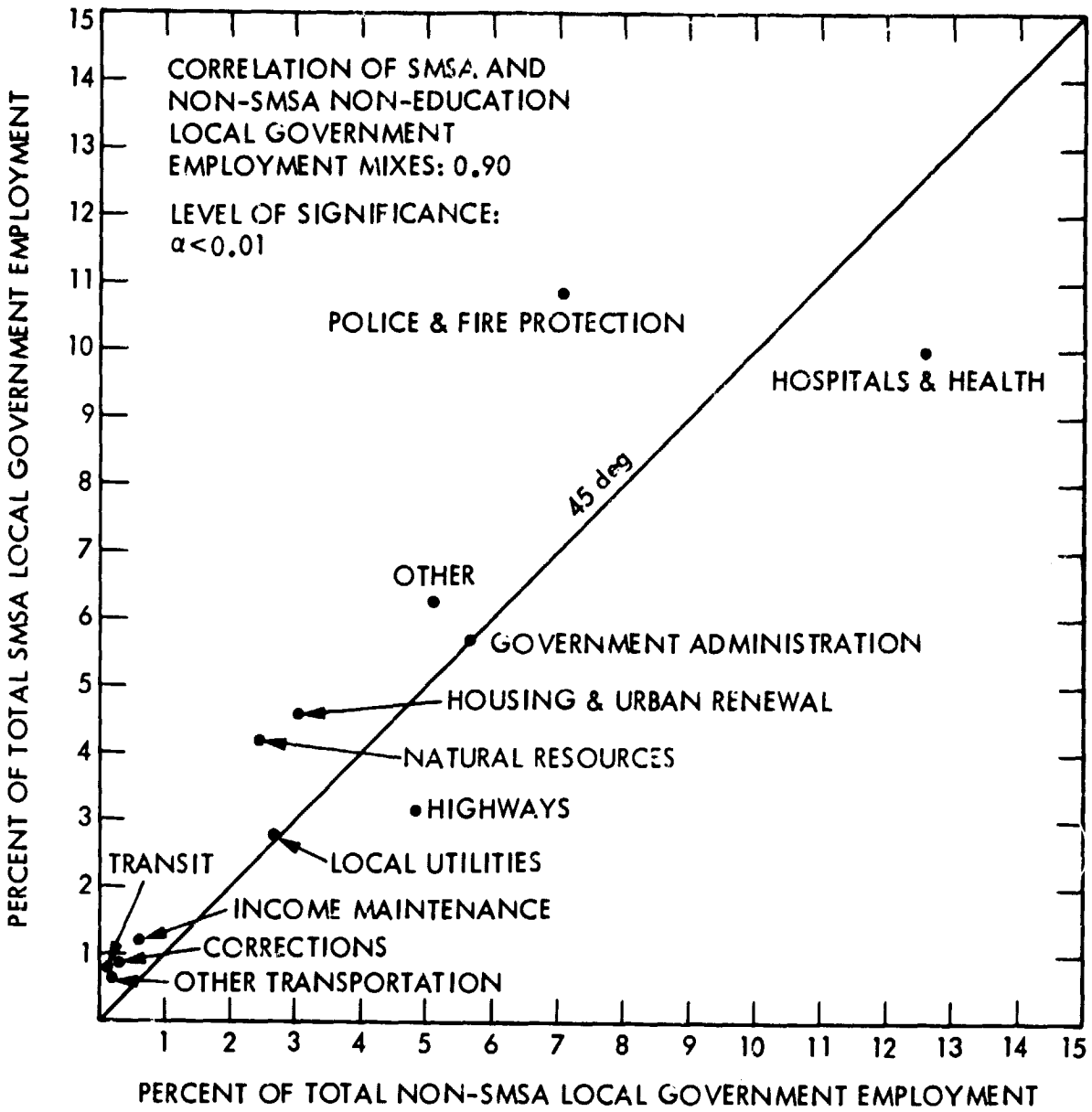

Figure F-3. Percentage Mix of SMSA versus Non-SMSA Local Government Employment, Florida, 1977

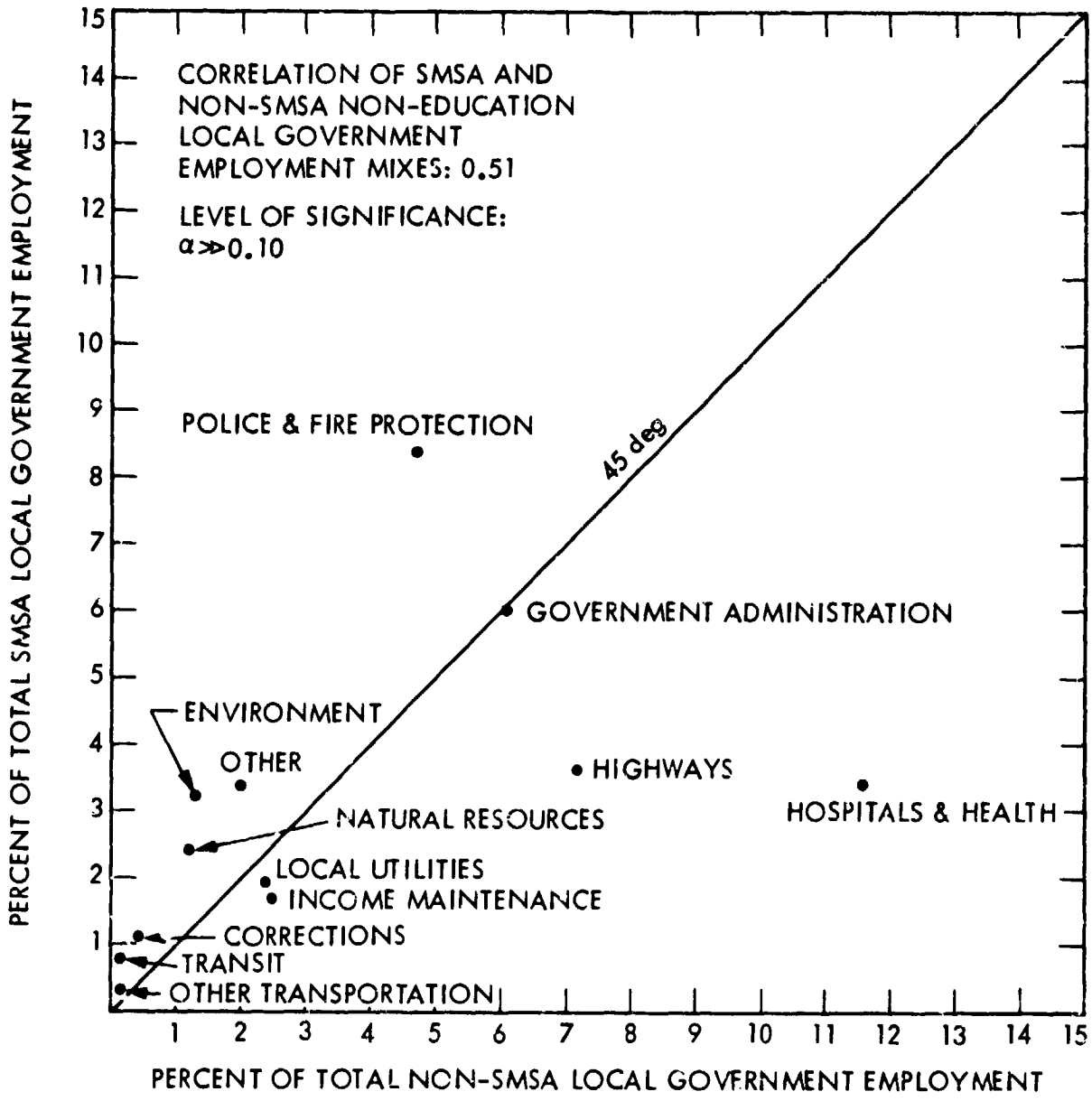

Figure F-4. Percentage Mix of SMSA versus Non-SMSA Local Government Employment, Iowa, 1977

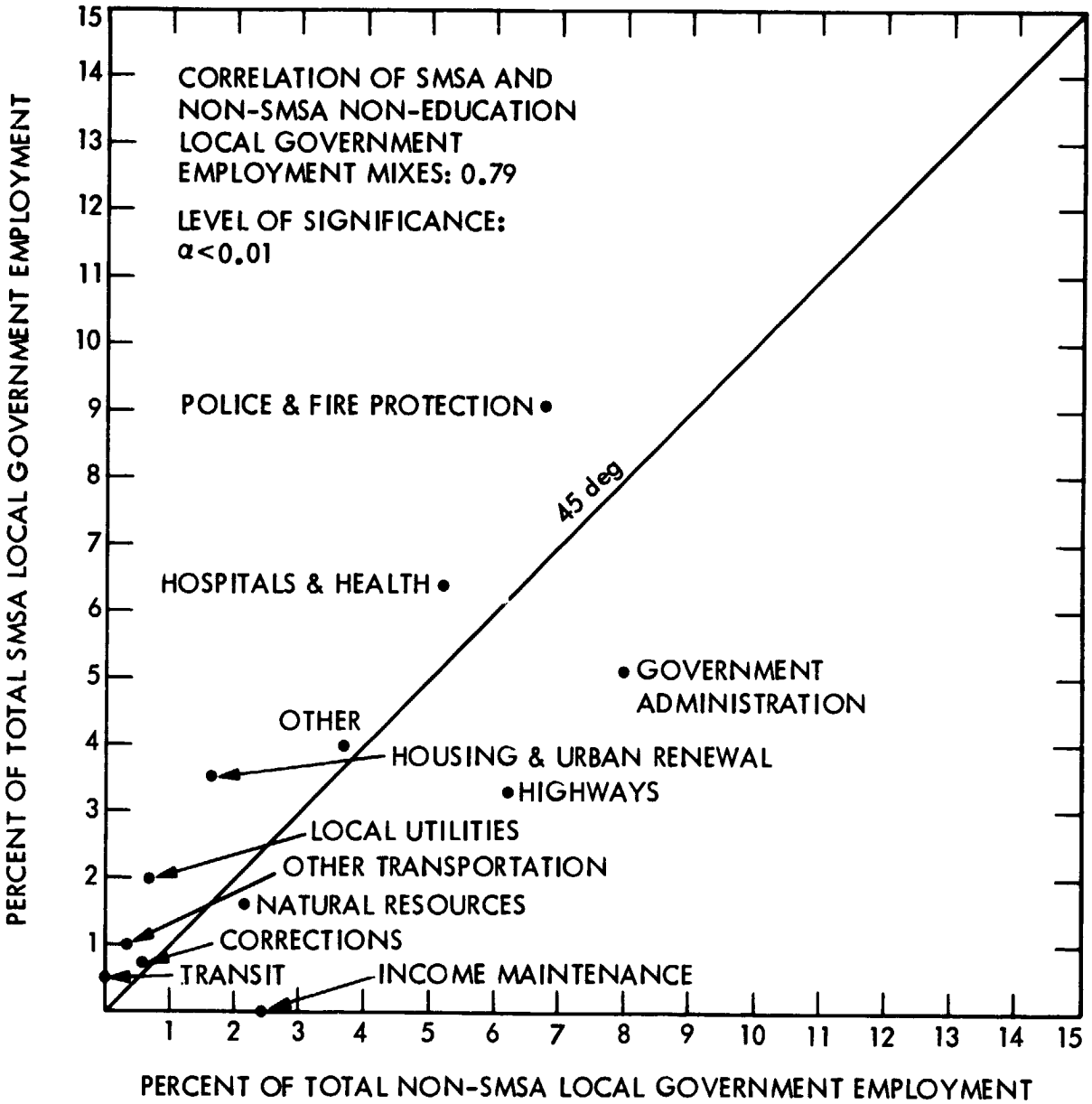

Figure F-5. Percentage Mix of SMSA versus Non-SMSA Local Government Employment, Montana, 1977

C-2

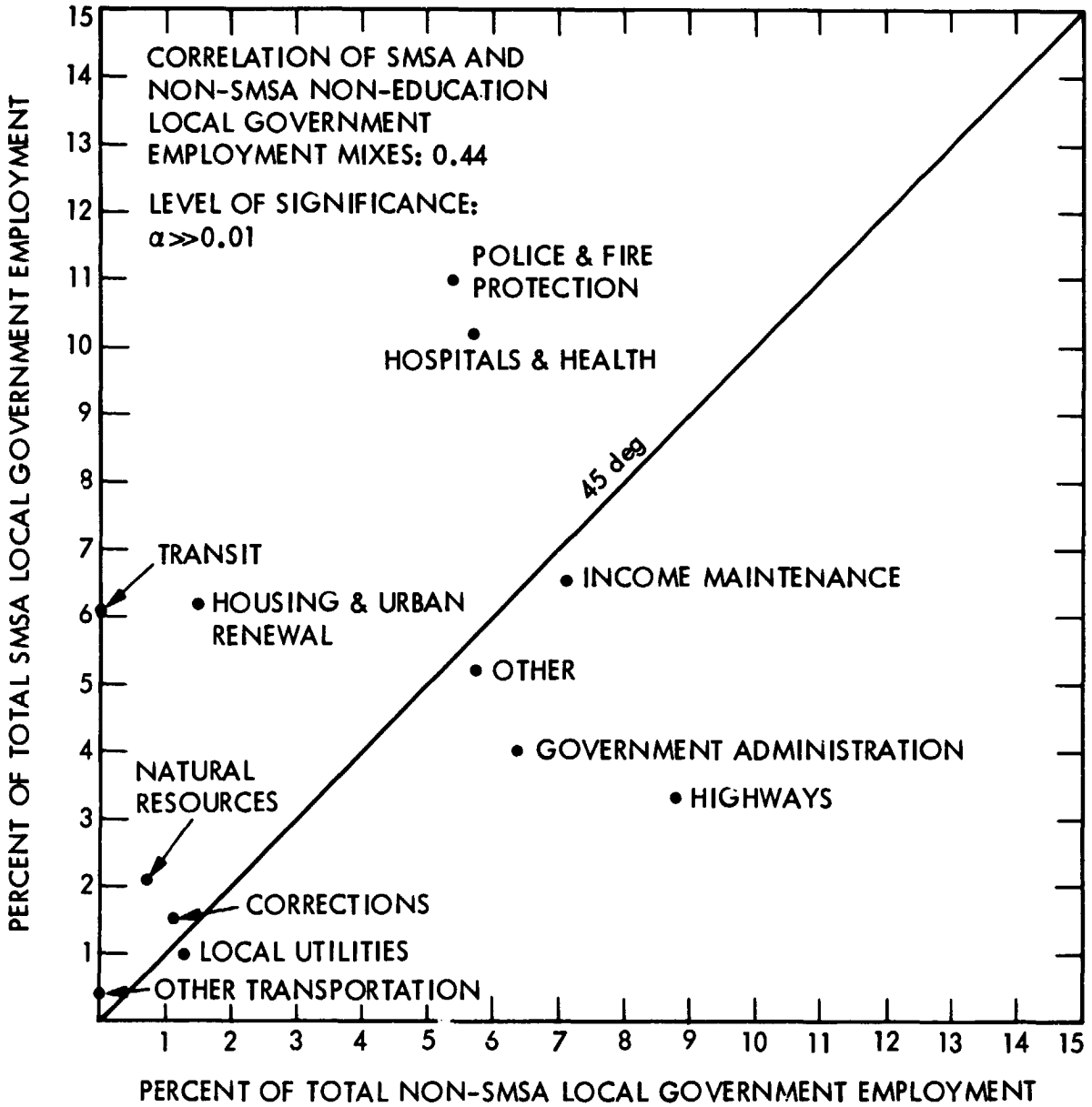

Figure F-6. Percentage Mix of SMSA versus Non-SMSA Local Government Employment, New York, 1977

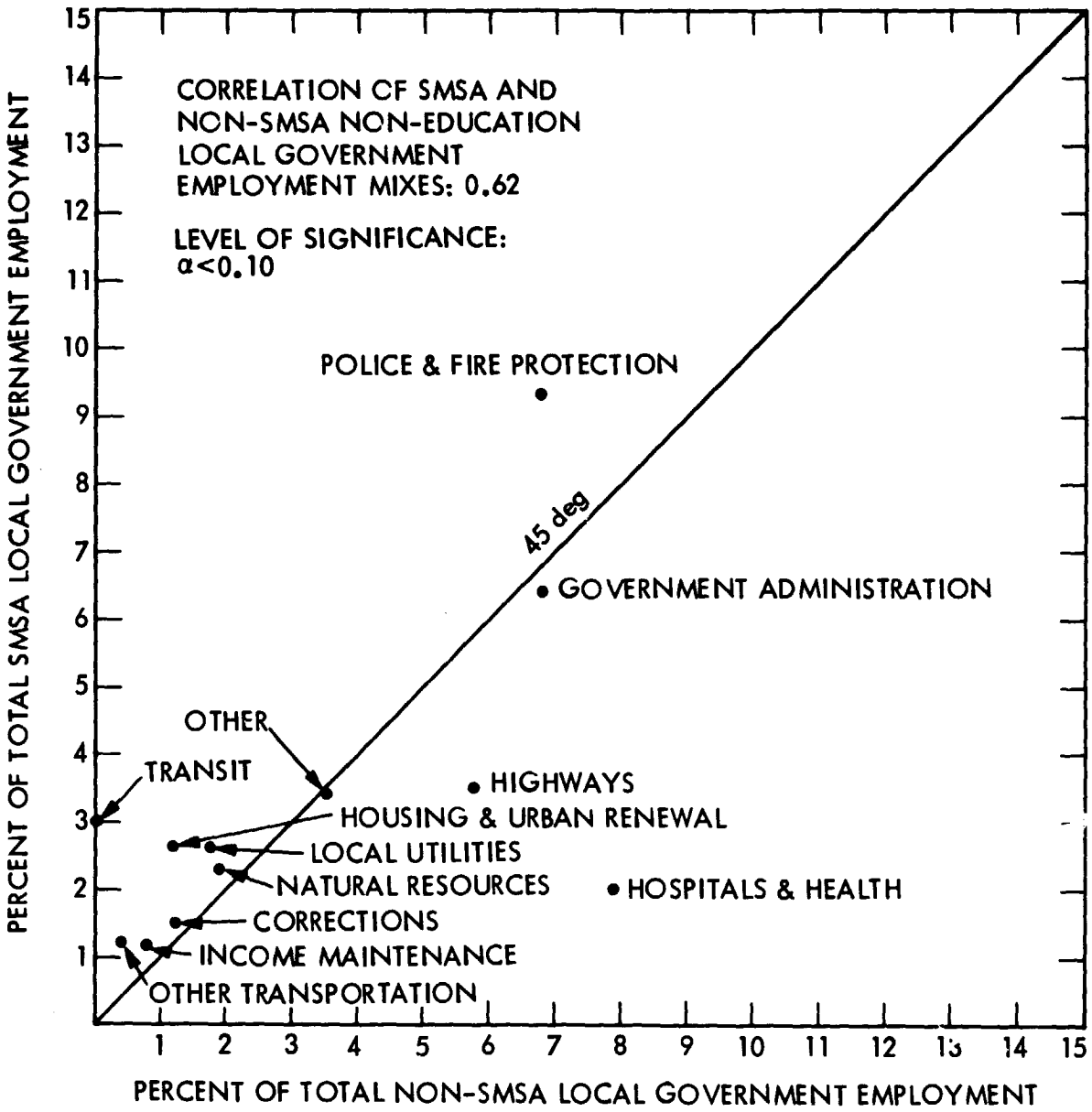

Figure F-7. Percentage Mix of SMSA versus Non-SMSA Local Government Employment, Oregon, 1977

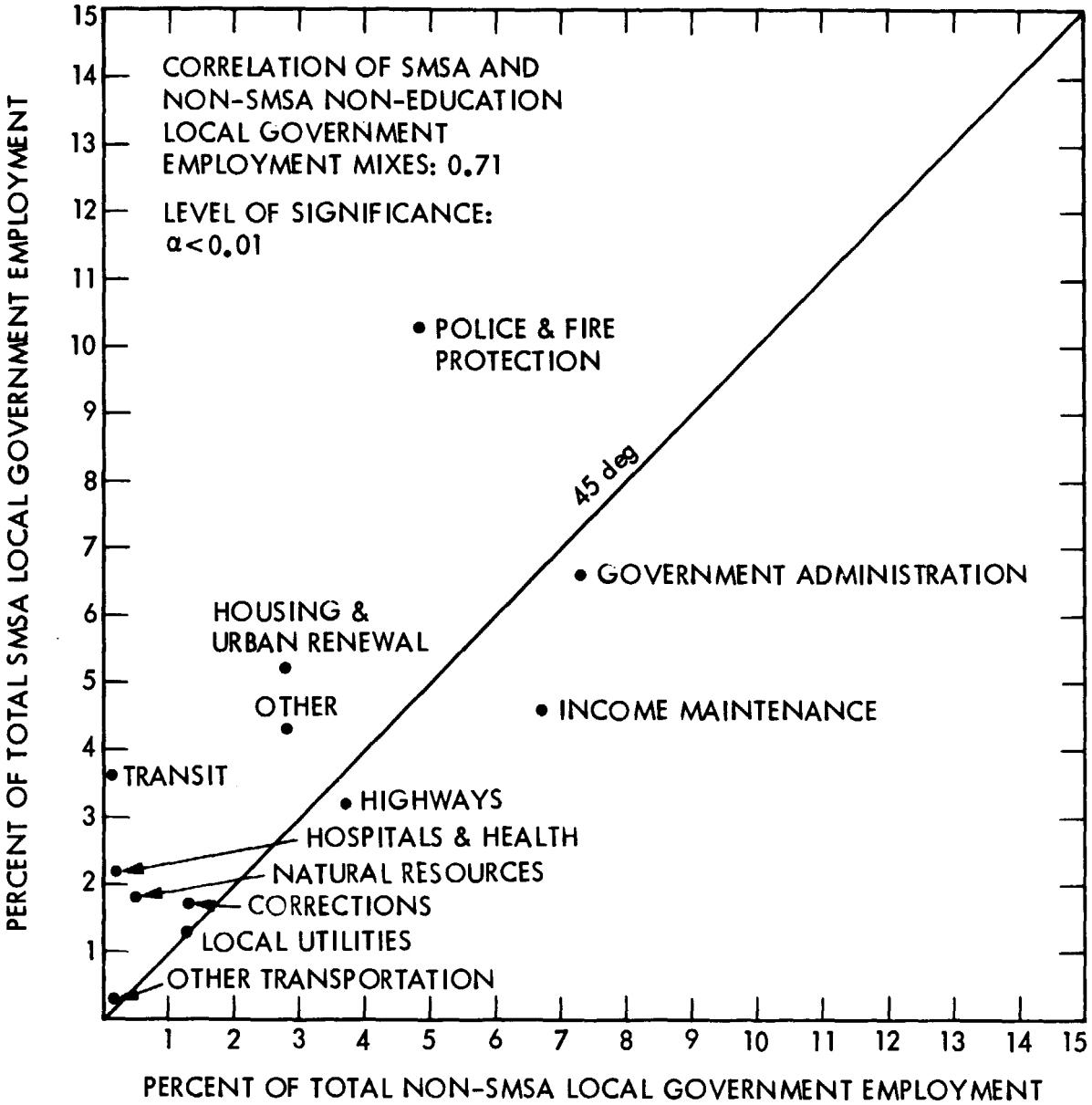

Figure F-8. Percentage Mix of SMSA versus Non-SMSA Local Government Employment, Pennsylvania, 1977

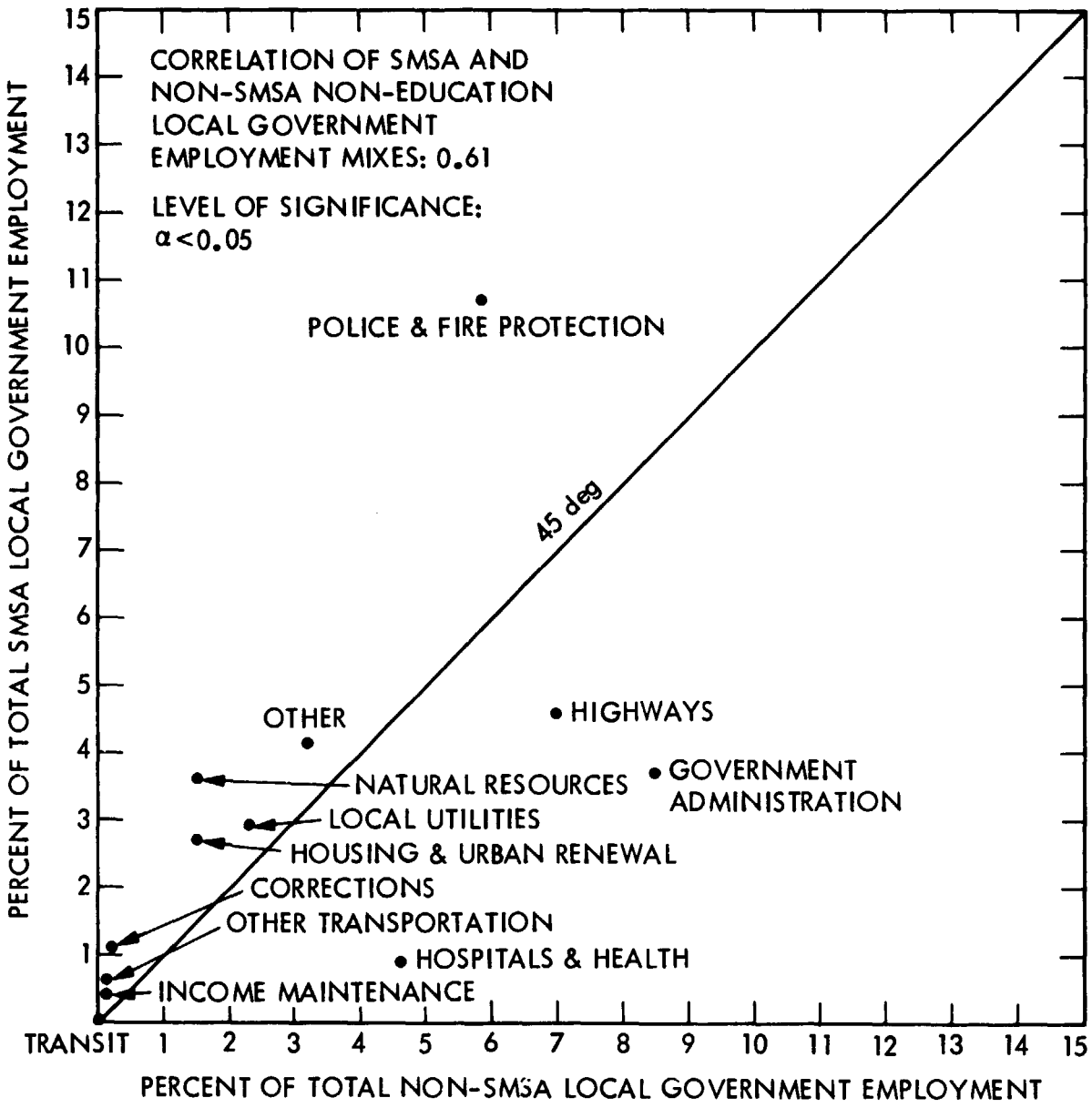

Figure F-9. Percentage Mix of SMSA versus Non-SMSA Local Government Employment, South Dakota, 1977

APPENDIX G

REVIEW COMMENTS FROM THE BUREAU OF THE CENSUS, GOVERNMENTS DIVISION

UNITED STATES DEPARTMENT OF COMMERCE
Bureau of the Census
Washington, D.C. 20233

July 25, 1984

Mr. Reed Wilcox
Systems Analysis Section
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, California 91109

Dear Reed:

I have looked over your study of local government activity regarding potential use of cellular radio-telephone service.[1] Generally, your findings parallel our own. We have looked chiefly at the 75 largest SMSA's. We found these 75 areas to have a higher proportion of police, fire, and transit employment and the remainder of the country to have the higher proportion of education, hospital, and highway employment.

I am enclosing a copy of our 1981 report on SMSA employment. This topic is mentioned in the first page of the text and in Table A.

In regard to the proportion of state highway employment in non-SMSA areas, since I have no hard data on miles of road per capita, I believe it would be safer to say that many state governments restrict their responsibilities for public roads to those areas outside of incorporated municipalities. This would place more of their employment in non-metropolitan areas than would be expected on population alone.

I know you are concerned about using 1977 data for the study. Based on what we can see from our annual sample surveys since the 1977 Census, there has been no appreciable change in the mix of employment types or shifts from urban to rural or vice versa.

Good luck with your work in this area. If I may be of any additional help, please call.

Sincerely,

Bern M. Bonifant

BERN M. BONIFANT
Employment Branch
Governments Division

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[1] Mr. Bonifant's reference to "cellular radio-telephone service" is a misnomer. This report concerns the use of land mobile communication services as they may apply to applications in non-metropolitan areas.