

# REGIONAL EMPLOYMENT GROWTH IN THE MIDWEST, 1971-82

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## **Introduction**

The geographic distribution of economic activity has changed substantially in the United States during the past four decades and these changes are reflected in regional development differentials among urbanized regions in the Midwest. Higher employment growth rates are found in the south and southwest with relatively slower growth in the north and northeast. In the Midwest this corresponds to differences in the faster growth urban economies in Colorado, New Mexico and Oklahoma, and the more traditional industrialized regions in Missouri, Kansas and Nebraska.

The purpose of this article is to analyze differences in the level and composition of employment growth in the major urbanized regions of these states during the 1970s and early 1980s. Employment growth rates for the major urbanized regions are described and the sources of change are analyzed by decomposing observed employment changes into the traditional shift-share components. Unlike most shift analyses, however, the emphasis here is on the longer term maladjustments in individual sectors where observed employment changes run counter to measures of regional comparative advantage. There are sharp contrasts in adjustment patterns between the high and low growth urbanized regions with a temporal persistence that explains much of the aggregate growth rate differential.

This article is organized into the following major sections. Section II describes the method used in decomposing regional employment growth and provides an overview of aggregate employment growth for the U.S. and the sample of midwestern regions. The third and fourth sections provide a detailed analysis of employment changes by major sector and disaggregated sectors for services and manufacturing. A final section provides a summary and concluding remarks.

## **Model and Aggregate Employment Growth**

The data include the number of full and part-time employees found in eight major urbanized regions and four aggregations of urban areas over the 1971-82 period as compiled by the Bureau of Economic Analysis (U.S. Department of Commerce). The spatial definitions correspond to those established for Metropolitan Statistical Areas (MSAs) for the 1980 Census of Population. To contrast structural changes, two separate subperiods (1971-75 and 1975-82) are distinguished. These dates correspond to the lowest U.S. employment/population ratios covering the two major business cycles during these years.

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The model on which the calculations are based is due to Arcelus<sup>1</sup> and is expressed in the following equation:

<b>expected employment</b>	<b>differential employment</b>
$\Delta E_{ij} = E'_{ij}e_{oo}$	$+ (E_{ij} - E'_{ij})e_{oo}$
$+ E'_{ij}(e_{io} - e_{oo})$	$+ (E_{ij} - E'_{ij})(e_{io} - e_{oo})$
$+ E'_{ij}(e_{oj} - e_{oo})$	$+ (E_{ij} - E'_{ij})(e_{oj} - e_{oo})$
$+ E'_{ij}[(e_{ij} - e_{oj}) - (e_{io} - e_{oo})]$	$+ (E_{ij} - E'_{ij})[(e_{ij} - e_{oj}) - (e_{io} - e_{oo})]$

where  $\Delta E_{ij}$  = observed employment change,  $i^{\text{th}}$  industry,  $j^{\text{th}}$  region  
 $E_{ij}$  = base period actual employment,  $i^{\text{th}}$  industry,  $j^{\text{th}}$  region  
 $E'_{ij}$  = base year employment if  $i^{\text{th}}$  sector,  $j^{\text{th}}$  region had the same percent of national total employment as the  $i^{\text{th}}$  national sector  
 $e_{oo}$  = national growth rate, total employment  
 $e_{io}$  = national growth rate,  $i^{\text{th}}$  sector  
 $e_{oj}$  = regional growth rate, total employment  
 $e_{ij}$  = regional growth rate,  $i^{\text{th}}$  sector

The rows of this equation correspond to the major three components of the shift-share decomposition and the columns distinguish the expected and differential employment effects. Rows (1) and (2) are the national growth and industry mix effects and rows (3) and (4) are the regional share effects. (The latter includes both a pure and differential regional effect.) The columns show the expected and differential employment partition designed to deal with the correlation between industry mix and regional share effects.<sup>2</sup> If  $E_{ij}$  equals  $E'_{ij}$ , then the differential effects are zero and only the expected effects can be calculated. Also note that while the national expected employment effect ( $E'_{ij}e_{oo}$ ) is positive, the other terms can be positive or negative but will always add up to  $\Delta E_{ij}$ .

Significant structural changes in employment underlie the aggregate U.S. employment growth rates shown in Table 1. The aggregate U.S. rate rose to slightly over 2.0 percent per year in 1975-82, but the finance-insurance-real estate (FIRE) and services sectors grew at twice this rate. Total manufacturing employment grew at .4 percent annually over the same period, with nondurables growth at less than half the rate for durables employment. Over the 1975-82 period, 11 of 21 disaggregated manufacturing sectors experienced employment declines (just one less than for the earlier four year period) and only instruments, electrical machinery, rubber

<sup>1</sup> See Francisco J. Arcelus, "An Extension of Shift Share Analysis," *Growth and Change*, vol. 15, no. 1, January 1984, pp. 3-8, for an explanation of this model and an excellent bibliography of applications of the basic shift share model.

<sup>2</sup> The original proposed solution to this problem is found in J.M. Esteban-Marquillas, "A Reinterpretation of Shift-Share Analysis," *Regional and Urban Economics*, vol. 2, no. 3, 1972, pp. 249-261.

**TABLE 1**  
**Aggregate Annual Growth Rates in Employment:**  
**U.S., Region, and MSA**

	1971-75*	1975-82*	Rank (1971-75, 1975-82)
<b>United States</b>	.0160	.0207	
Central region:†	.0149 (-)	.0135 (-)	(4, 3)
Kansas City	.0046 (-)	.0060 (-)	(8, 8)
Wichita	.0404 (+)	.0199 (-)	(4, 6)
Northern region:‡	.0227 (+)	.0118 (-)	(3, 4)
Omaha	.0152 (-)	.0154 (-)	(7, 7)
Southern region:‡	.0291 (+)	.0454 (+)	(2, 2)
Oklahoma City	.0215 (+)	.0524 (+)	(6, 2)
Tulsa	.0491 (+)	.0485 (+)	(1, 3)
Mountain region:‡	.0409 (+)	.0495 (+)	(1, 1)
Albuquerque	.0479 (+)	.0373 (+)	(2, 5)
Colorado Springs	.0412 (+)	.0417 (+)	(3, 4)
Denver	.0391 (+)	.0543 (+)	(5, 1)

\*Pluses and minuses indicate above and below-average growth compared with the United States.

†Ranks are high (one) to low (four to eight) for regions and MSAs separately.

‡The regions include the MSAs listed with the following additions:

    Central: Columbia, Mo., Springfield, Mo., and Topeka, Kan.

    Northern: Lincoln, Neb., and Sioux City, Iowa.

    Southern: Lawton, Okla., Fayetteville, Ark., and Ft. Smith, Ark.

products and printing and publishing grew at annual rates exceeding 2.0 percent. Government, transportation, and construction were other slow-growth sectors, and wholesaling and retailing grew at rates only slightly above the aggregate U.S. rate. National shifts in employment from manufacturing to services continued over the entire 1971-82 period and should be reflected in employment growth patterns within this region.

Table 1 also shows the lagging performance of urbanized regions in the central and northern parts of the Midwest. The central region experienced the slowest rates of employment growth over both periods, with the northern region slowing considerably during the 1975-82 period. Only the northern region in 1971-75 had a growth rate exceeding the U.S. average and the central region's employment growth rate declined in 1975-82 despite an increase in the pace of economic activity nationally. Kansas City has experienced very low employment growth rates ranking last among the

eight MSAs in both periods and improving only marginally in 1975-82. Wichita's exceptional growth during 1971-75 was sharply reversed in 1975-82 and Omaha has consistently low employment growth in both periods.

In contrast to the north and south, regions in the mountain and southern states usually improved their growth performance in 1975-82 and exceeded national averages in both periods. As shown in Table 1, the mountain region outgrew all other regions in both periods, and the southern region's growth rate almost doubled in the 1975-82 period. Both Oklahoma City and Denver showed significant increases in growth over the two periods, each rising four ranks among the eight MSAs. Tulsa and Colorado Springs maintained a high employment growth pace with slight changes between the two periods and only Albuquerque's growth slowed significantly in 1975-82. As indicated by the pluses in columns (1) and (2) of Table 1, all regions and MSAs in the south and west outperformed in the average rate of employment growth in the nation.

### **Employment Growth by Major Sector**

Two measures from the equation in section II are used to assess the change in regional comparative advantage. First, the sum of the pure and differential regional effects is calculated for each sector and expressed as a proportion of the actual employment change occurring over the period. The average of this proportion over all sectors is a summary measure of the relative importance of regional factors in accounting for the actual employment change. As larger negative or positive regional effects indicate greater importance, the algebraic sign in this calculation is disregarded.

The second measure indicates how the sector's regional comparative advantage is changing in relation to its actual employment change. If actual employment change is positive (negative) and the measure of regional comparative advantage is negative (positive), then the sector is not adjusting in accordance with its estimated local advantage. If a particular region has numerous sectors moving in the same direction as the comparative advantage measures, this suggests a more fluid adjustment in the region's economy.<sup>3</sup> The measure used here is the ratio of employment changes moving in the opposite direction to regional comparative advantage divided by total employment change. The employment changes in both the numerator and denominator of this ratio are summed over all sectors for the regional advantage components of the equation in Section II to provide a summary measure.

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<sup>3</sup> In MSAs with mixtures of positive and negative employment changes among sectors, some intersectoral job changes in the resident labor force will occur and will partially account for low aggregate employment growth. These patterns could also be efficient if employment changes were consistent with the regional measures of comparative advantage.

Table 2 shows these two measures and the net employment change for 1975-82 for the eight MSAs. The second measure is parenthesized in the first and second columns of this table, and the population ranks are shown in the third column. Note that Denver had the largest population and net employment change for all MSAs along with the lowest proportion (.224) of its sector's employment changing in the opposite direction to the measures of regional comparative advantage. Kansas City, conversely, had only about 2,000 fewer residents than the second largest MSA (Oklahoma City) but the lowest net employment change for 1975-82 and a much larger proportion of its employment moving contrary to the regional measures. Colorado Springs had about one-third of the resident population of Kansas City, but over twice the net employment gain for these seven years. The more efficient adjustments in the economies of the Colorado MSAs were probably an important factor in explaining their high growth rates in Table 1.

Table 2 suggests a somewhat wide variation among MSAs in the significance of regional measures in accounting for total employment change. (Note that since individual components of the decomposition may be positive or negative the regional figures may exceed 100 percent.) This may be due to variant mixes of economic activity, overall regional growth rates and local sectoral rates of employment change, all of which are not unexpected in a region of this size. The regional measures were over six times as important in Kansas City as in Tulsa during the 1975-82 period. The most significant increases in the importance of the regional measures over the two periods occurred in Wichita, Omaha and Colorado Springs with the more important declines in Kansas City, Oklahoma City, Tulsa and Denver. The size of these changes seem reasonable given the length of time over which the calculations are made.

The significance of a changing importance of regional measures of comparative advantage depends on the direction of adjustment in local employment growth to these measures. Over the two periods (and excluding no change), there are four combinations in the pattern of changes for the two measures in Table 2. Wichita, for example, experienced an increase in both measures, with the largest percentage increase in the proportion of employment within maladjusting sectors of all MSAs.<sup>4</sup> Kansas City, Omaha and Tulsa also had increases in the proportion of maladjusting employment but only Omaha became more dependent on the regional measures. Conversely, Denver had a decline in both measures over the two periods, indicating a decrease in the importance of local

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<sup>4</sup> This is probably the worst of the four cases. Where maladjustment increases, but overall regional dependence declines, the problem may be efficient adjustment to external trade and not allocational efficiency in local factor markets. Similarly, reduced maladjustment may be associated with external or local efficiency depending on whether regional dependence declines or increases.

**TABLE 2**  
**MSA Employment Change for Major (one-digit) Sectors\***

	1971-75†	1975-82‡	Employment Change 1975-82‡
Kansas City	3.781 (.390)	3.034 (.524)	15,466 (3)
Wichita	.848 (.197)	1.184 (.559)	22,159 (7)
Omaha	.763 (.324)	1.303 (.746)	20,358 (5)
Oklahoma City	.622 (.370)	.575 (.240)	104,465 (2)
Tulsa	.738 (.140)	.469 (.229)	69,576 (4)
Albuquerque	.629 (.345)	.630 (.229)	40,894 (6)
Colorado Springs	.659 (.360)	.859 (.360)	32,547 (8)
Denver	.718 (.236)	.700 (.224)	204,320 (1)

\*Sectors included are construction, manufacturing, transportation, wholesale, retail, finance-insurance-real estate (FIRE), services, and government.

†The first number in each column is an unweighted average proportion of employment change accounted for by local comparative advantage. The number in parentheses is the proportion for gross employment change due to regional effects explained by sectors whose employment change ran counter to their regional comparative advantage.

‡The column entries are net employment change for the sectors listed in the first note above. The parenthesized numbers are the ranks for 1982 population sizes (1 = largest, 8 = smallest).

factors and more efficient adjustment to regional comparative advantage. For both periods (but particularly in 1975-82), there is a general decline in the two measures from the central MSAs into the southern and western parts of the region.

The pattern of sectoral changes within Omaha over the two periods illustrates the case of increasingly inefficient adjustment over time to patterns of regional comparative advantage. While only two of the eight major sectors were changing in opposition to the measures of regional advantage in 1971-75, this had risen to six sectors by 1975-82. For the latter period, employment declines were occurring in the construction, manufacturing and federal government sectors with complementary indicators of comparative advantage. By contrast, in only the retail and combined government sectors in 1971-75 were employment changes running counter to the regional measures.

In contrast to Omaha, Denver has become a high-growth MSA with stable and complementary measures of regional comparative advantage. The 204,320 increase in employment in the 1975-82 period was quite evenly distributed over the eight economic sectors, with the largest increases in services (59,000) and retailing (30,000). As opposed to a small

decline in Omaha, Denver's manufacturing sector grew by 21,000 employees with the largest increase (16,000) in durables production. For both periods, the only sector with regional measures running counter to employment change was wholesaling in 1971-75. While there were slight declines in the importance of local factors in manufacturing, retailing, FIRE and services, the changes were minor over both periods. The first measure ranged from .89 (manufacturing) to .34 (retailing) in the 1975-82 period and this was quite narrow compared to the other midwestern MSAs. Over both periods Denver displayed balanced development and stability along with generally high aggregate growth rates.

Kansas City's development patterns were quite similar to the measures noted above for Omaha. Employment declines during the later period occurred in construction, manufacturing, transportation and government with the local comparative advantage measures in agreement with these changes. Conversely, the growing sector (wholesale, retail, FIRE and services) all had regional measures suggesting the loss of local comparative advantage. Services employment grew by about 17,000 workers during 1975-82 despite a loss of comparative advantage for this sector. The second largest employment gain for the major sectors was in retailing with about 2,900 workers. Compared to Denver, this was a relatively small increase and can be attributed to the slow rates of employment and population growth throughout both periods.

An example of a southern MSA with a substantial increase in employment growth in the 1975-82 period is Oklahoma City. Services and government were maladjusting sectors in 1971-75, but no major sector had an employment change contrary to its measures of regional comparative advantage during 1975-82. Manufacturing employment grew by about 9,600 workers with complementary comparative advantage measures in the durable goods and overall manufacturing sectors. (This MSA did lose its comparative advantage in nondurable manufacturing with an employment increase of only 245 workers.) As in Denver, the largest employment increases were in retailing (25,000) and services (24,000). The energy boom in Oklahoma during the second period may have contributed to the improved consistency of the regional comparative advantage measures.

The other MSA employment changes were less dramatic. Colorado Springs lost about 2,200 workers in the government sector in the later period, but maintained a fairly strong local comparative advantage in manufacturing. Also in the 1975-82 period, Wichita experienced a minor employment decline in construction (104 employees) and its maladjusting sectors were retailing, services, total government and the nondurables component of total manufacturing. Tulsa had a substantial decline in the importance of the regional measures over the two periods, but (like Albuquerque) has positive employment changes in all eight sectors during the 1975-82 period.

These sectoral development patterns seem consistent with longer term growth differentials among the MSAs included here. In urbanized regions

with strong growth, either generally or in a few leading sectors, it is likely that secondary industries will adjust efficiently to the reduced uncertainty due to consistent performance; employment changes in these sectors will be complementary to their measures of regional comparative advantage. Conversely, where no leading sectors emerge or only moderate growth is achieved the greater uncertainty is reflected in employment adjustments that are more volatile and less efficient. Central and northern MSAs exhibit the latter pattern, while more consistent adjustments are found in the high-growth MSAs of the south and southwest.

### **Services and Manufacturing Employment**

The traditional local-export market dichotomization of the services and manufacturing sectors is oversimplified, particularly in the larger MSAs included here.<sup>5</sup> As regional populations rise the importance of local markets, particularly for final products, is likely to also increase at the expense of exports. For example, more of the output of the automotive assembly sector is likely to be sold locally and very technology-intensive services often develop which sell to households and firms outside of the MSA. Medical centers are an example of a service which often have national and international markets for their output. The MSA populations are large with a fairly wide range in size (1,520,000 in Denver to 331,000 in Colorado Springs in 1982), so it is likely that the relative significance of national and local economic factors is much less sharp between the services and manufacturing sectors than for urban regions of a smaller size.

**Services:** The services sector shown in Table 3 undoubtedly reflect widely variant spatial markets among the midwestern MSAs. Local government services are probably most spatially contiguous with MSA boundaries, while parts of state and federal government employment will be serving businesses and households outside of the MSA; the private sectors of banking, medical and legal services will also have important external markets, particularly in the largest MSAs as noted above. Services to dwellings and buildings are probably the most local-oriented component of miscellaneous business services. The latter also includes advertising, commercial art and photography, news syndicates, personnel supply services, equipment rental and leasing and the high technology sector of computers and data processing. Miscellaneous services include engineering-architectural surveying, non-commercial educational-scientific research organizations and accounting-auditing-book-keeping.

With the exception of the federal government employment, all services sectors in Table 3 had positive growth over the 1975-82 period with generally lower growth rates where the regional comparative advantage measures were running counter to employment changes. Federal government employment

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<sup>5</sup> Economic base theory provides the basis for this dichotomization and a good exposition can be found in James Heilbrun, *Urban Economics and Public Policy*, 2nd edition, St. Martin's Press, New York, pp. 153-169.



**TABLE 3**  
**Services Comparative Advantage And**  
**Employment Growth by MSA, 1975-82\***

Sector/MSA	Kansas City	Wichita	Omaha	Oklahoma City	Tulsa	Albuquerque	Colorado Springs	Denver
Banking	(-) .0314	—	—	(+) .0881	(+) .0548	—	(-) .0260	(+) .0727
Misc. business	(-) .0067	(-) .0419	(-) .0846	(+) .1284	(+) .1261	(-) .0749	(-) .0470	(+) .1681
Medical	(+) .0761	(+) .0710	(-) .0580	(+) .0993	(+) .0661	(+) .0708	(+) .0595	(-) .0424
Legal	(+) .0944	(-) .0756	(-) .0787	(+) .1536	(+) .1281	(+) .1489	(+) .1342	(+) .1595
Miscellaneous	(-) .0012	—	(-) .0220	(+) .1193	(+) .1128	(+) .1058	(+) .1660	(+) .1067
Federal Government	(+) .0111	(+) .0070	(+) .0083	(+) .0108	(+) .0237	(+) .0026	(+) .0067	(+) .0138
State/local Government	(+) .0108	(-) .0048	(+) .0108	(+) .0407	(+) .0344	(+) .0240	(+) .0188	(+) .0145

\*The tabled numbers are average annual employment growth rates for 1975-82. The (+) signs indicate employment change in accordance with the measures of regional comparative advantage and (-) signs are for sectors where employment changes ran counter to these measures.

declined in Wichita, Omaha, Oklahoma City and Colorado Springs while increasing in the 1 to 2 percent range in Kansas City, Tulsa and Denver. Across columns for a given service the higher growth rates also tend to be associated with the positive signs. For example, employment changes in banking were about 2 to 3 percent in Kansas City and Colorado Springs whereas the measures of regional comparative advantage indicated employment declines. Much higher growth rates (in the range of 5 to 8 percent) were experienced in Oklahoma City, Tulsa and Denver where local factors indicated positive employment growth in the banking sector. This pattern holds for all services sectors shown in Table 3. Also note the particularly high growth rates that are attained in the miscellaneous business, legal and miscellaneous sectors.

The first three columns of Table 3 indicate the mixed adjustment patterns and low growth rates in services for MSAs in the central part of the region. Kansas City maintained a comparative advantage in medical and legal services, but not in the other three private services sectors; particularly weak growth is shown in miscellaneous business services and the miscellaneous sector. Wichita also had a local comparative advantage in medical services, but not in miscellaneous business and legal services. Although fairly high growth rates are indicated for Omaha, all four of the private services sectors had employment changes moving counter to their measures of comparative advantage. Compared with MSAs to the south and west, the growth rates of central MSAs tend to be quite low. The 9.4 percent legal services growth rate in Kansas City is the highest for central MSAs and is often exceeded in the other five MSAs to the south and west.

The last five columns of Table 3 indicate the degree of services employment decentralization to southern and western MSAs in the region. These MSAs had complementary patterns of employment adjustment in most sectors with the single declining sector being federal government employment in Oklahoma City. Albuquerque should have had a decline in miscellaneous business service employment and Denver's medical services employment ran counter to its measures of comparative advantage. (The latter is perhaps due to the growing importance of Salt Lake City as an important medical center.) Colorado Springs' maladjusting sectors were banking and miscellaneous business services and this may be due to its contiguity to Denver where the growth of those two sectors was substantially higher. The 16.8 percent growth rate in Denver's miscellaneous business sector is the highest rate for these five MSAs but is closely comparable with other rates in the legal and miscellaneous sectors.

The characteristics for selected services shown in Table 3 are also consistent for all services sectors aggregated to the one-digit level. The following are percents of employment change due to the regional measures of comparative advantage (with negative signs indicating maladjusting sectors) and the 1975-82 employment change (in thousands of employees):

Kansas City	(-.4285, 17.0)	Wichita	(-.1289, 8.6)
Omaha	(-1.1530, 4.9)	Oklahoma City	(.3470, 24.9)
Tulsa	(.4068, 22.7)	Albuquerque	(.3152, 14.7)
Colorado Springs	(.2430, 1.1)	Denver	(.4204, 59.4)

All MSAs experienced positive employment growth in the total services sector, but Kansas City, Wichita, and Omaha had negative measures of regional comparative advantage. Tulsa and Denver had the highest complementary measures of local comparative advantage and, with Oklahoma City, also accounted for the largest absolute growth in services employment over this period.

**Manufacturing:** Despite the decline of manufacturing nationally, this sector has several desirable characteristics from the viewpoint of employment substitution particularly in agriculturally distressed states. (1) This sector offers a broad employment base with lower skill levels than many services sectors. These skills can usually be learned on the job and rural towns with manufacturing establishments often act as transitional training centers for unemployed workers in the agricultural sector. Nondurables sectors are preferred from the viewpoint of cyclical sensitivity. (2) Manufacturing also usually offers high annual earnings per worker with wage rates often established in broader regional union agreements. These externally set wage rates may affect earnings in the services sectors and tend to reduce inequalities in local income distributions.

The manufacturing employment series for individual MSAs is subject to some annual instability due, in part, to disclosure rules. Hence two adjustments in estimation methods were made to attain the statistics shown in Table 4. (1) The data are aggregated into the larger regional definitions given in Table 1, but only if complete employment estimates are available for a single MSA for both the initial and terminal years of the period. (2) As some observations are missing, estimates of  $E_{ij}$  are inadequate and only  $E_{ij}$  is calculated in the equations shown in Section II above. Thus it is assumed that  $E_{ij}$  equals  $E_{ij}$  and the differential components of the measures of regional comparative advantage are zero. The  $E_{ij}$  are attained from national proportions of employment accounted for by each sector multiplied by total employment estimates added across all MSAs in a given region.

The adjustment patterns shown in Table 4 are particularly mixed for MSAs in the central part of the region. Six of the 11 durables sectors had measures of local comparative advantage running counter to actual employment change over the 1975-82 period. Two of these sectors (primary and fabricated metals) should have had positive employment growth but actually declined although at slow rates. The machinery (except electrical), electronic equipment, transportation equipment and instruments sectors experienced low positive growth but had negative measures of comparative advantage. In the nondurables sectors the adjustments are somewhat improved with only one sector (printing and publishing) experiencing positive growth when its regional measures were negative. Seven sectors, accounting for 38 percent of the industries shown in Table 4, had negative growth and the highest positive growth rate was only 4.9 percent in motor vehicles employment. The high technology sectors (instruments and electronic equipment) had negative measures of comparative advantage, while chemicals employment rose but not at a particularly high rate.

**TABLE 4**  
**Manufacturing Comparative Advantage And**  
**Employment Growth By Region, 1975-82\***

	Central	Northern	Southern	Mountain
<b>Nondurables:</b>				
Food and kindred	(+)-.0421	(+)-.0569	(+).0196	(-)-.0007
Textile mill products	—	—	—	(+).1857
Apparel and textiles	(+)-.0200	—	(+)-.0354	(+)-.0264
Paper and allied	(+).0089	(+).0086	(+).0064	—
Printing and publishing	(-).0246	(+).0437	(+).0341	(+).0864
Chemicals and allied	(+).0254	—	(+).1938	(+).1388
Petroleum and coal	(+).0089	—	(+)-.0218	—
Rubber and plastics	(+).0308	—	(+).0317	(+).0833
Leather products	—	—	(+)-.1098	—
<b>Durables:</b>				
Lumber and wood	(+).0138	(+).0056	(+)-.0108	(+).1488
Furniture and fixtures	(+)-.0407	—	(+)-.0387	—
Primary metals	(-)-.0212	—	—	(+).0378
Fabricated metals	(-)-.0009	(-)-.0011	(+)-.0058	(+).0786
Machinery	(-).0044	(+)-.0233	(+).0880	(+).1075
Electronic equipment	(-).0222	(+)-.0011	(+)-.0022	(+).4183
Transportation equipment	(-).0085	+.0938	(+).0677	—
Motor vehicles	(+).0498	(+)-.0294	(+).1121	(+).0021
Stone, clay, glass	(+)-.0087	(+)-.0524	(+).0311	(+).0541
Instruments	(-).0024	—	—	—
Misc. manufacturing	(+)-.0143	—	(+).1285	(+)-.0846

\*The tabled numbers are average annual employment growth rates for 1975-82. The (+) signs indicate employment change in accordance with the measures of comparative advantage and (-) signs are for sectors where employment changes ran counter to these measures. The regional definitions are footnoted in Table 1.

The adjustments are much more consistent for the rest of the MSAs shown in Table 4. All the manufacturing sectors in the southern part of the region had employment changes consistent with their measures of comparative advantage, while the mountain region should have experienced positive growth only in the food and kindred sector. While fewer sectors could be estimated in the northern region, fabricated metals employment should have increased, while it experienced a slight decline. As with the central region, the inconsistently adjusting employment sectors had generally low growth rates which are expected when the comparative advantage measures are negative. The percentages of sectors with negative annual growth rates over the 1975-82 period are 60 percent (northern), 41 percent (southern) and 21 percent (mountain). With the exception of the two sectors noted above, all of these

industries were adjusting in accordance with their measures of regional comparative advantage.

The higher sectoral growth rates tend to be found in the southern and mountain parts of the region. In addition to motor vehicles in the central region (noted above), the north's highest growth rate was 9.3 percent in transportation equipment followed by 4.3 percent in printing and publishing. Higher growth rates in the south occurred in chemicals, motor vehicles and miscellaneous manufacturing employment, with lower growth in the machinery and motor vehicles sectors. Mountain sectors with growth rates exceeding 10.0 percent include textile mill products, chemicals, lumber and wood products, machinery and electronic equipment; sectors with at least 5.0 percent growth are printing and publishing, rubber and plastics, fabricated metals and stone, clay and glass products. Thus, the southwestern decentralization of manufacturing employment continued through the 1975-82 period as measured both by the size of growth rate and diversity of positive growth rates among manufacturing sectors shown in Table 4.

### **Summary and Concluding Remarks**

The following summarizes the analysis of regional employment growth patterns within the midwestern sample of MSAs over the 1971-82 period:

(1) The regional measures of comparative advantage have been emphasized in this paper. When actual employment change moves in the opposite direction to these measures, the regional fails to converge on its optimal industrial mix. Both the importance of the regional measures combined with the significance of the tendency to deviate from this optimal adjustment pattern could explain low growth in total employment. It should be noted, however, the local growth differentials are not the only measures of regional comparative advantage, excluding estimates of changes in factor intensity, relative factor prices and real production costs.

(2) Overall employment growth rates for MSAs within the sample indicate the strength of shifts of employment to the south and west. This shift continues in 1975-82 during an accelerated period of national growth from similar patterns experienced in 1971-75. Also, the percent of changes accounted for by sectors that are inappropriately adjusting to measures of regional comparative advantage were higher for northern and central MSAs than for urbanized regions to the south and west.

(3) The more detailed examination of the services and manufacturing sectors confirm patterns of adjustment noted in (2) above. Generally, fewer sectors with inappropriate patterns of adjustment are found in the faster growth southern and mountain MSAs of the region. The evidence suggests that northern and central MSAs are inefficiently adapting to changes in sectoral comparative advantage. The faster growth regions also tend to have higher rates of positive employment growth through a broader array of sectors.

Three concluding remarks are suggested from the employment growth patterns summarized above:

(1) In regions with rapidly growing leading sectors, it is likely that both forward and backward linkage risks are low with appropriate long term efficient adjustment patterns more easily discerned than in low growth, transitional regions. For low growth regions this suggests the importance of correctly perceiving their comparative advantage in a few sectors rather than pursuing development on a more comprehensive basis.

(2) The length of time period covered and strength of differential employment growth among MSAs and subregions does not suggest significant reversals of these patterns in the short run. Nor is it likely that these north-south differentials can be attributed to variations in public development efforts among MSAs and states within the midwest.

(3) It should finally be noted that no particular normative significance attaches to high or low regional employment growth. The public significance sector problems in low growth MSAs with stable land use patterns may well be preferred to the high cost and often inefficient pattern of public services expansion in rapidly growing urbanized regions. But it is also likely that substantial private costs accompany the inefficient adjustment patterns noted in this paper and methods of estimating and reducing these transitional costs would be a significant topic of future research.