



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

PROCEEDINGS — Nineteenth Annual Meeting

Theme:

“Theory, Reality, and Promise:
Transportation Faces Tomorrow”

October 24-25-26, 1978

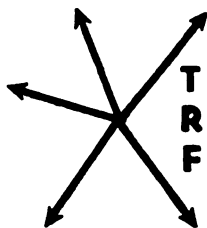
Biltmore Hotel

New York, New York



Volume XIX • Number 1

1978



TRANSPORTATION RESEARCH FORUM

The Transportation Impacts of Economic and Geographic Trends

by Charles P. Zlatkovich*

THE ECONOMIC and geographic changes in the United States since 1950 have significantly affected the nation's transportation system. Many of the trends established during the past quarter century can be expected to continue through the remainder of the twentieth century and to have continuing effects on the transportation system.

SHIFTS IN THE AMERICAN ECONOMY

Economic trends that continued throughout the 1950-1975 period include the relative decline of manufacturing as a contributor to total national income and the increasing importance of the service industries and of government. Significantly, two trends established well before 1950 have reversed direction since 1970. Both the agriculture sector and the mining sector had been in a relative decline for many years prior to 1950, and they continued to lag behind the rest of the economy until the early 1970s. Since 1970 both sectors have increased in relative importance and can be expected to continue modest increases throughout the remainder of the century. The American agricultural sector will benefit from the relative abundance of arable land in the United States and from the high productivity of American agriculture. As evidenced by foreign trade statistics and other indicators, agriculture has become one of the things that America does best. The reversal of the long-term declining importance of the mining sector is largely a result of the increase in energy price levels since 1973. Table 1 shows the historic and projected trends in the American economy as measured by the percentage contribution of each sector to total national income.

The shift of the American economy away from goods-producing activities and toward service-producing activities has contributed to a decline in the relative importance of the transportation industry. Another factor in the relative decline of the transportation sector is the increased use of private, rather than

public or for-hire, transportation. The relative decline of the transportation sector has been striking. In 1929, the transportation sector accounted for 7.6 percent of total national income.¹ The railroad industry alone accounted for 5.2 percent and was more than three times as large a contributor as the entire federal government in that pre-depression year. The decline of the transportation sector is to a large extent a consequence of the decline of the railroad industry. The other segments of the transportation industry have grown, but not fast enough to offset the continuing decline of the railroads. In 1950, transportation accounted for 5.5 percent of national income, with the railroad industry providing 2.9 percent. By 1975, railroads accounted for only .8 percent of national income, and the transportation sector was down to 3.6 percent.

The decline of the transportation sector has been more relative than absolute. The total volumes of freight and passenger traffic moving in the United States have increased steadily, although total traffic volume has grown faster than the volume handled by for-hire carriers. Passenger traffic volumes have increased more rapidly than freight traffic volumes. Total passenger-miles in 1975 were well over 2.6 times the 1950 level, while freight ton-miles were about 1.9 times the corresponding level. A much higher portion of total passenger traffic than of freight traffic moves by private transportation so the transportation industry missed out on much of the more rapidly growing market. Throughout the industry increased productivity has enabled fewer transportation employees to perform more work. Total transportation employment remained relatively stable during the period, declining slightly from 2,784,000 in 1950 to 2,630,000 in 1975.²

Although the volume of freight traffic handled by each major mode increased between 1950 and 1975, the portion of the total freight traffic handled by railroads increased less rapidly than total freight traffic, and the railroads steadily lost market share. The railroads were particularly hard hit by the relative decline of the goods-producing industries, especially mining and agriculture. The primary, or unprocessed, products of

*Research Associate, Bureau of Business Research, The University of Texas at Austin.

TABLE 1

PERCENT OF TOTAL NATIONAL INCOME BY MAJOR INDUSTRIAL SECTOR, 1950-1975 AND PROJECTIONS THROUGH 2000

	<u>1950</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>
Agriculture	7.5	4.2	3.0	3.4	3.6	3.8	4.0
Mining	2.2	1.3	1.0	1.4	1.4	1.7	1.9
Construction	4.9	5.0	5.4	5.0	4.8	4.1	3.6
Manufacturing	31.4	30.0	26.8	25.0	25.2	24.3	23.6
Transp., Commun., & Pub. Utils.	8.5	8.4	7.8	7.7	7.6	7.5	7.5
Wholesale & Retail Trade	16.9	15.5	15.2	15.7	15.1	15.0	14.9
Finance, Insur., & Real Estate	9.4	11.6	11.5	11.5	11.5	11.2	11.0
Services	8.9	10.7	12.8	13.5	13.5	14.2	14.7
Government	9.7	12.6	15.8	16.0	16.4	17.2	17.9
Rest of the World	.5	.6	.6	.8	.8	.8	.8
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

mines, agriculture, and forestry make up 48 percent of all rail carloadings.⁸ Coal alone accounts for 20 percent, with other products of mines contributing an additional 16 percent and farm and forest products contributing 12 percent. Many of the same products return to the rails in processed form, with the primary and secondary products of mining and agriculture accounting for at least three-fourths of all rail freight traffic. Competing with the railroads for the same bulk products are the waterways and, for some commodities, the trucks and the pipelines, all of which have experienced relative growth since 1950. The high-value products most characteristic of the increasingly service-oriented economy move almost exclusively by truck and by air.

The projected relative growth of the agriculture and mining sectors would seem outwardly to be most beneficial to the rail and water modes. Increased emphasis on coal production has been assumed by many observers to be particularly favorable to rail transportation. Although the potential for an increase in rail market share exists, that potential will probably not be realized. The nation moved away from the old-style coal and railroad energy system for a number of good reasons. The recent coal strike indicates the continuing validity of many of those reasons, including high labor intensity, high labor costs, and lack of dependability. The nation is not likely to return to the old system. Surface mines, slurry pipelines, and mine-

site coal conversion plants are more representative of the future than are the underground shafts and hopper cars of the past.

Much of the projected relative growth of the mining and agriculture sectors may be attributed to changes necessary to meet future energy demands. Much of the energy demand is for transportation fuel. Future transportation fuels will come from both the mining and agricultural sectors. Mobil Corporation has demonstrated a process for conversion of coal into gasoline at a cost of about \$1.00 per gallon.⁴ Coal conversion and gasification plants will almost certainly be located near the mine sites. Agriculture offers an even more promising long-term solution to the transportation energy problem through the conversion of biomass into methanol, usable in existing distribution systems and vehicles with only minor modifications. The transportation requirements for these products are likely to be handled in a manner very similar to the methods currently used by the oil and natural gas industries, with primary emphasis on pipelines.

REGIONAL CHANGES IN ECONOMIC ACTIVITY

A distinguishing characteristic of the quarter century between 1950 and 1975 was the relative decline of the Northeast and North Central states and the relative rise of the South and West. The trend generally accelerated during the

period. (The regions used for the examination are shown in Figure 1. The population changes for the 1950-1975 period and projections through the year 2000 are shown in Table 2.) The Northeast and North Central states began the second half of the twentieth century with 55.7 percent of the nation's population, declined to 50.6 percent in 1975, and now contain less than half. Continuation of the trend will place 56 percent of the nation's population in the South and West by the year 2000. The widely discussed Sunbelt phenomenon and the continuing homogenization of America are contributing to the trend.

The population shifts are definitely significant, but even more significant to the transportation industry are the geographic shifts in economic activity that have occurred during the same period. These shifts have generally been more pronounced than the population shifts. Table 3 shows the distribution of several economic indicators by region as of 1975. Table 4 shows the change in each region's percentage of the national total that occurred for each indicator between 1950 and 1975.

While the percentage of the nation's population in the Northeast and North Central regions declined by 5.1 percent between 1950 and 1975, the percentage of the nation's income earned by the

residents of the region declined by 8.6 percent. National per capita income levels are tending to converge, an occurrence that is partly responsible for the relative decline, since income levels in the Northeast were, and still are, higher than in most other regions.

Several other economic indicators changed even more sharply. The percentage of total nonagricultural employment in the Northeast and North Central regions fell by 10.7 percent. The share of manufacturing employment fell by 13.7 percent, despite a gain in the West North Central states. The regions' share of solid mineral production fell by 12.8 percent, and even agricultural production fell by 3.1 percent although the West North Central states posted a significant gain.

The long-term impact of such shifts in the goods-producing industries on the transportation sector is substantial. Although the various components of the transportation sector have reacted to the change, some evidence exists that the regional changes may contribute to further modal shifts within the transportation sector. The percentage of total employment in the transportation, communication, and public utilities industries in the Northeast and North Central states declined by 9.1 percent during the 1950-1975 period. Complete com-

REGIONS OF THE UNITED STATES



FIGURE 1

TABLE 2
REGIONAL POPULATION, ADJACENT 48 STATES, 1950-1975
AND PROJECTIONS THROUGH 2000 (In Thousands)

	<u>1950</u>	<u>1960</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1990</u>	<u>2000</u>
New England	9,314	10,509	11,847	12,187	12,527	13,207	13,887
Middle Atlantic	30,164	34,168	37,213	37,269	37,325	37,437	37,549
East North Central	30,399	36,225	40,265	40,945	41,625	42,985	44,345
West North Central	14,061	15,394	16,328	16,690	17,052	17,776	18,500
South Atlantic	21,182	25,972	30,679	33,658	36,637	42,595	48,553
East South Central	11,477	12,050	12,808	13,515	14,222	15,636	17,050
West South Central	14,538	16,951	19,326	20,867	22,408	25,490	28,572
Mountain	5,075	6,855	8,290	9,625	10,960	13,630	16,300
Pacific	14,486	20,339	25,476	27,041	28,606	31,736	34,866
TOTAL	150,696	178,463	202,232	211,797	221,362	240,492	259,622

TABLE 3
REGIONAL PERCENT OF NATIONAL TOTAL FOR SELECTED
INDICATORS, 1975

	<u>POPUL</u>	<u>PRSNL INCOM</u>	<u>NONAG EMPL</u>	<u>MANUF EMPL</u>	<u>AGRI PROD</u>	<u>SOLID MINER</u>	<u>TRANS EMPL</u>	<u>RAIL EMPL</u>	<u>TRUCK EMPL</u>	<u>RAIL MILES</u>	<u>MOTOR VEHIC</u>	<u>AIRPL</u>
New England	5.8	5.9	6.1	7.2	1.2	.8	4.9	2.4	4.7	2.7	5.3	3.7
Middle Atlantic	17.6	19.2	18.2	19.1	3.9	12.1	19.3	14.9	17.6	7.4	14.7	9.0
East North Central	19.3	20.0	19.9	25.3	17.3	14.1	18.3	23.7	21.8	18.1	18.9	16.6
West North Central	7.9	7.7	7.8	6.7	27.1	8.9	8.6	14.0	9.5	21.2	8.7	11.4
South Atlantic	15.9	14.8	15.7	14.4	11.5	20.7	15.5	13.5	14.6	12.7	16.1	13.9
East South Central	6.4	5.1	5.7	6.7	6.0	14.9	5.0	6.8	6.0	7.4	6.7	5.0
West South Central	9.9	8.9	9.3	7.2	12.4	7.0	10.6	8.7	9.2	12.8	10.6	13.2
Mountain	4.5	4.3	4.4	2.3	7.8	18.8	4.8	5.9	4.1	10.1	5.4	9.1
Pacific	12.8	14.1	12.9	11.0	12.8	2.9	13.1	10.1	12.6	7.6	13.7	18.1
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Alaska and Hawaii excluded.

POPUL = Population
 PRSNL INCOM = Personal Income
 NONAG EMPL = Nonagricultural Employment
 AGRI PROD = Agricultural Production
 SOLID MINER = Solid Mineral Production
 TRANS EMPL = Transportation, Communication, and Public Utility Employment

RAIL EMPL = Railroad Employment
 TRUCK EMPL = Trucking and Warehousing Employment
 RAIL MILES = Railroad Mileage
 MOTOR VEHIC = Number of Motor Vehicles
 AIRPL = Number of Aircraft

parable data for all segments of the transportation sector are not readily available. The transportation, communication, and public utilities regional change was comparable to the overall change in the goods-producing industries. Within the transportation sector, the trucking industry adjusted to the

shift in general conformity with the overall pattern, reducing the portion of its employment in the Northeast and North Central states by 8.9 percent. The railroad industry adjusted with less conformity to the overall pattern of the goods-producing industries. The railroad industry reduced its percentage of em-

TABLE 4

CHANGE IN REGIONAL PERCENT OF NATIONAL TOTAL FOR SELECTED INDICATORS, 1950-1975

	POPUL	PRSNL INCOM	NONAG EMPL	MANUF EMPL	AGRI PROD	SOLID MINER	TRANS EMPL	RAIL EMPL	TRUCK EMPL	RAIL MILES	MOTOR VEHIC	AIRPL
New England	-.4	-.7	-1.3	-2.4	-1.1	-.1	-.5	-1.2	-1.1	-.2	-.4	.1
Middle Atlantic	-2.4	-4.2	-6.0	-8.1	-2.5	-10.0	-4.7	-5.4	-3.2	-1.2	-2.3	-2.2
East North Central	-.8	-2.5	-3.2	-4.2	-.9	-1.8	-2.5	.5	-2.2	.3	-2.5	-3.3
West North Central	-1.5	-1.2	-.2	1.0	1.4	-.9	-1.4	1.1	-2.4	.2	-2.4	-3.6
South Atlantic	1.8	3.5	3.3	3.4	1.1	2.4	4.1	1.1	4.3	.3	4.1	3.1
East South Central	-1.2	.4	.7	2.2	-.2	3.9	.2	.3	.6	.4	1.0	1.2
West South Central	.2	1.1	1.9	2.9	.1	1.9	1.3	1.0	.3	-.5	.4	.6
Mountain	1.2	1.1	1.6	1.2	.6	5.3	.8	.5	.7	.2	1.1	1.7
Pacific	3.2	2.5	3.3	4.0	1.5	-.8	2.7	2.0	3.1	.5	1.0	2.4
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Alaska and Hawaii excluded.

ployment in the Northeast and North Central regions by an overall 5.0 percent but increased the relative level of employment in the North Central states by 1.6 percent in the face of net declines in most goods-producing activities in the region. Much of the rail industry adjustment may have been attributable to the withdrawal from the region's once significant passenger business and to the financial plight of the Northeastern carriers. The relative increase in rail employment and mileage in the declining North Central regions provides a clue to the deteriorating health of some of the carriers in the region and to the relative inability or unwillingness of the industry to adjust to changing conditions. Rail investment and employment are more concentrated in the North Central states than any other major economic activities except agriculture and have increased relatively while other industries in the region have generally declined.

THE EVOLUTION OF DECENTRALIZED METROPOLITAN AREAS

Another significant trend that is influencing the transportation industry but that is probably not yet fully understood is the development of what might be described as decentralized metropolitan areas. Large metropolitan agglomerations have existed for many years and have been defined and classified as standard metropolitan statistical areas and/or standard consolidated statistical

areas. Historically, most metropolitan areas conformed to a basic pattern of a large central city with a well-defined central business district that served as the focal point for the area. Around the central city were suburbs, and beyond the suburbs were less developed areas. The decentralized metropolitan area differs from the classical pattern in that it has no single, well-defined focal point. Instead, the decentralized metropolitan area may have multiple focal points, often to the extent that it has no focal point at all in the traditional sense. The Los Angeles area was a precursor of the decentralized metropolitan area and was often derisively described in the recent past as "a group of suburbs in search of a city." However, Los Angeles has more distinct focal points than many of the decentralized metropolitan areas. Neighboring Orange County is more representative of the decentralized metropolitan area landscape.

The decentralized metropolitan areas defy precise description, in part because they are still evolving. Decentralized metropolitan areas are characterized by relatively low population densities, a multiplicity of activity centers, and a heavy reliance on automotive transportation. Metropolitan areas that exhibit at least some of the characteristics of the decentralized metropolitan areas include the Anaheim-Santa Ana-Garden Grove SMSA (Orange County), the Dallas-Fort Worth SMSA, and the Houston-Galveston SCSA. Most decentralized

metropolitan areas have evolved from traditional metropolitan areas and still have many traditional characteristics. The characteristics of the decentralized metropolitan area are most pronounced in the South and West because most recent growth has occurred in those parts of the country, but the decentralized metropolitan area is not exclusively a Sunbelt phenomenon.

The decentralized metropolitan area is a creature of modern transportation and communication systems and could not function without them. The telephone line and the freeway are the ties that bind decentralized metropolitan areas together, and in many cases the airport is a more significant activity center than the central business district. The automobile and the truck serve most of the day-to-day transportation requirements within such areas, while the automobile, truck, and airplane connect the areas with each other. To most decentralized metropolitan area residents, other forms of transportation are out of sight and out of mind.

Although "urban sprawl" has few friends and "mass transit" has few enemies among the traditional shapers of national opinion, "the word" has apparently not filtered out to the American people. In increasing numbers, people are voting with their feet (or wheels) in favor of the decentralized metropolitan area as the place-style of the fu-

ture. The metropolitan areas with the characteristics of the decentralized metropolitan area are among the nation's fastest growing areas. In traditional metropolitan areas nationwide, the portions of the metropolitan area outside the central city have had 85 percent of the growth occurring since 1950.⁵ Metropolitan area central cities nationwide have actually declined in population since 1970. According to a recent U. S. Bureau of the Census study quoted in *The Wall Street Journal*, the percentage of American commuters who use public transportation to get to work has declined from 15.7 percent in 1970 to 12.3 percent in 1975.⁶ While the decentralized metropolitan area and the transportation system that have made it possible are not without problems or detractors, they seem to be giving the people what they want.

THE TRANSPORTATION IMPLICATIONS OF CHANGE

Each of the economic and geographic changes explored—the shifts in the structure of the American economy, the regional changes in economic activity patterns, and the development of decentralized metropolitan areas—will have significant impacts on the transportation system. Most of the indicators point in a common direction toward a continuation of recent trends in freight and passenger transportation. Tables 5 and 6 show the historic and projected future

TABLE 5

TOTAL FREIGHT TON-MILES AND PERCENT OF TOTAL BY MODE, 1950-1975 AND PROJECTIONS THROUGH 2000 (In Millions)

	1950	1960	1970	1975	1980	1990	2000
Railroads	596,940	579,130	771,168	759,000	829,186	931,162	1,031,585
Trucks	172,860	285,483	412,000	443,000	522,982	650,742	779,493
Waterways	163,344	220,253	318,560	342,210	375,531	432,942	489,998
Pipelines	129,175	228,626	431,000	488,000	559,406	690,552	822,587
Air	318	778	3,295	3,430	4,354	5,919	7,508
TOTAL	1,062,637	1,314,270	1,936,023	2,035,640	2,291,459	2,711,317	3,131,171
Railroads	56.2	44.1	39.8	37.3	36.2	34.3	32.9
Trucks	16.3	21.7	21.3	21.8	22.8	24.0	24.9
Waterways	15.4	16.8	16.5	16.8	16.4	16.0	15.6
Pipelines	12.2	17.4	22.3	24.0	24.4	25.5	26.3
Air	-	-	.2	.2	.2	.2	.2
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Generated at University of Minnesota on 2021-10-19 15:12 GMT / https://hdl.handle.net/2027/mdp.39015035374381 / Creative Commons Attribution-NonCommercial-NoDerivatives / http://www.hathitrust.org/access_use#cc-by-nc-nd-4.0

TABLE 6

**TOTAL PASSENGER MILES AND PERCENT OF TOTAL BY MODE,
1950-1975 AND PROJECTIONS THROUGH 2000 (In Millions)**

	1950	1960	1970	1975	1980	1990	2000
Private Auto	438,293	706,079	1,026,000	1,164,000	1,313,680	1,593,775	1,874,018
Private Airplane	1,299	2,228	9,101	11,500	13,112	17,306	21,484
Air Carrier	8,773	31,730	109,499	136,432	159,172	211,074	262,774
Bus	26,436	19,327	25,300	25,000	26,183	28,192	30,249
Rail	32,481	21,574	10,903	10,075	10,552	11,362	12,190
TOTAL	507,282	780,938	1,180,803	1,347,007	1,522,699	1,861,709	2,200,715
Private Auto	86.4	90.4	86.9	86.4	86.3	85.6	85.2
Private Airplane	.3	.3	.7	.9	.9	.9	1.0
Air Carrier	1.7	4.1	9.3	10.1	10.5	11.3	11.9
Bus	5.2	2.5	2.1	1.9	1.7	1.5	1.4
Rail	6.4	2.8	.9	.7	.7	.6	.6
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

trends in intercity freight and passenger transportation.

Total demand for freight and passenger transportation will continue to grow. Truck transportation will enjoy continued growth because of its adaptability to changing regional patterns and to the transportation requirements of the decentralized metropolitan areas. The ability of trucks to go anywhere, anytime, will be a key factor in their continued growth despite relatively high labor and energy costs. Pipeline transportation will handle the transportation jobs for which it is feasible as replacements for petroleum are produced and made available for transport in liquid or gaseous form. Air freight traffic will grow rapidly but will remain relatively small in comparison with total traffic. Rail and waterway traffic will continue to grow, though less rapidly than total freight traffic.

Passenger transportation will continue to be dominated by the private automobile with air carriers and private airplanes making continued narrow gains in overall market share. Bus and rail travel will probably increase in propor-

tion to total population increase, though less rapidly than total passenger travel demand.

Within traditional metropolitan areas and the decentralized metropolitan areas, the automobile will remain the dominant form of personal transportation. Energy supply problems will be met initially by gains in vehicle efficiency and later by use of petroleum substitutes. Ultimately most transportation energy requirements will be met by renewable-resource based sources.

FOOTNOTES

1 Statistics in this paragraph refer only to the transportation industry, as distinguished from the transportation, communication, and public utilities sector referred to in Table 1. Data were obtained from U. S. Department of Commerce, Bureau of Economic Analysis, *The National Income and Product Accounts of the United States, 1929-1974*, and *Survey of Current Business*, July 1977.

2 *Ibid.*

3 Association of American Railroads, *Yearbook of Railroad Facts*, 1977.

4 *The Wall Street Journal*, January 13, 1978.

5 U. S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States*, 1977.

6 *The Wall Street Journal*, March 14, 1978.

SOURCE NOTES FOR TABLES

TABLE 1: 1950-1970 data developed from U. S. Department of Commerce, Bureau of Economic Analysis, *The National Income and Product Accounts of the United States, 1929-1974*. 1975 data developed from U. S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, July 1977. Projections developed by author.

TABLE 2: 1950-1975 data developed from U. S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States*, 1977. Projections developed by author.

TABLES 3 and 4: Regional percentages of national totals calculated from data obtained as follows: Population, *Statistical Abstract of the United States, 1977*; Personal income, *Survey of Current Business, August 1974 and August 1977*; Nonagricultural employment, manufacturing employment, and transportation, communication, and public utility employment, U. S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings, States and Areas, 1939-1975*; Agricultural production, *Statistical Abstract of the United States, 1952 and 1976*; Solid mineral production from total mineral production less oil and gas production, *Statistical Abstract of the United States, 1953 and 1976*; Railroad employment, U. S. Department of Commerce, Bureau of Economic Analysis, *Regional Employment by Industry, 1940-1970* and Association of American Railroads, *Yearbook of Railroad Facts, 1976*; Trucking and warehousing employment, *Regional Employment by Industry, 1940-1970* and U. S. Department of Commerce, Bureau of the Census, *County Business Patterns, United States Summary, 1974*; Railroad mileage, U. S. Interstate Commerce Commission, *Transport Statistics in the United States, 1950 and Yearbook of Railroad Facts, 1977*; Number of motor vehicles, U. S. Department of Transportation, *Federal Highway Administration, Highway Statistics Summary to 1975*; Number of aircraft, U. S. Civil Aeronautics Administration, *Statistical Handbook of Civil Aviation, 1951* and U. S. Department of Transportation, *Federal Aviation Administration, Statistical Handbook of Aviation, 1975*. In some instances, the raw statistics are not precisely comparable over time, but the effect of noncomparability is minimized by the use of percentages of national totals as the basis for development of the tables.

TABLES 5 and 6: 1950-1975 data developed from *Yearbook of Railroad Facts, 1977*. Projections developed by author.

PROJECTIONS, TABLES 1, 2, 5, and 6: All projections were developed by the author using linear regression, annual compound growth rates, and other statistical techniques. For each industrial sector, geographic region, or transportation mode, independent projections were developed based on long-term (generally 1950-1975), short-term (generally 1970-75), and intermediate trends. The projections selected for inclusion in the tables were those which represented the situation most likely to occur in the personal judgment of the author.

Generated at University of Minnesota on 2021-10-19 15:12 GMT / <https://hdl.handle.net/2027/mdp.39015035374381> / http://www.hathitrust.org/access_use#cc-by-nc-nd-4.0
 Creative Commons Attribution-NonCommercial-NoDerivatives /