
Manufacturing: A Silent Force in the Tenth District Economy

By Tim R. Smith

The economy of the Tenth Federal Reserve District is frequently identified by its rich supply of natural resources. While it is true that agriculture and mining are relatively more important to the district than to the nation, these sectors directly account for only a small share of the total value of goods and services produced in the district. The largest share of district output is owned by manufacturing. Yet the importance of manufacturing in district states is often understated, and the characteristics of the region's manufacturing sector are not widely known.

This article describes the dimensions of the district's manufacturing sector and considers the outlook for its key industries. The first section establishes the importance of manufacturing to the region's economy. The second section reviews the industrial composition of manufacturing output and employment in the district and identifies the district's three key industries: transportation equipment, industrial machinery, and food processing. The third section provides a more detailed description of the district's key industries and shows how important these indus-

tries are to individual district states. The final section explores how the outlook for the key industries will be shaped by such factors as domestic and foreign economic growth, regional trade developments, and defense spending cuts.

HOW IMPORTANT IS MANUFACTURING TO THE DISTRICT?

To determine the size of the manufacturing sector and understand its characteristics, analysts use two measures—output and employment. Considering these two measures together helps give a fuller picture of the manufacturing sector than using either measure alone. For example, productivity enhancements may lead to growth in output accompanied by shrinking employment. As a result, an industry may have only a small share of total manufacturing employment but a large share of output. The importance of such an industry to the manufacturing sector may therefore be understated if only employment is used to measure importance.

The district's manufacturing sector is often ignored because it accounts for a smaller share of economic activity in the region than in the nation.¹ Manufacturing accounts for 19.3 percent of the region's total output of goods and services as measured by gross state product

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(GSP), compared with 22.5 percent in the nation.² And manufacturing jobs account for 15.1 percent of the total number of nonagricultural jobs in the district, compared with 17.9 percent in the nation.

Still, manufacturing ranks as a major force in the district economy. Compared with the district's other economic sectors, manufacturing accounts for the largest share of output in the region and is a major source of employment (Chart 1). Manufacturing generates 19.3 percent of the region's total output of goods and services and 15.1 percent of its jobs. Moreover, many manufacturing jobs are among the highest paying jobs in the district (box).

The importance of manufacturing varies widely across the seven district states (Chart 2). Missouri is the district's most industrial state with 26.5 percent of its output and 19.0 percent of its employment in manufacturing. Kansas ranks a close second with about 22.1 percent of its output and 17.3 percent of its employment in manufacturing. Oklahoma, Colorado, and Nebraska depend somewhat less on manufacturing, while New Mexico and Wyoming rely very little on manufacturing.

THE DISTRICT'S MANUFACTURING PROFILE

Factory production is spread across many industries in the district, encompassing both durable and nondurable goods manufacturing. The shares of manufacturing output and jobs accounted for by the district's major industries are shown in Table 1. Examining these shares provides a profile of the district's manufacturing base and reveals the district's key industries.

Durable goods industries

Durables industries account for 62.7 percent

of district manufacturing, nearly the same share as in the nation. Durables industries also provide a large share of the region's factory jobs, accounting for 57.6 percent of the district's manufacturing employment, a somewhat larger share than in the nation.

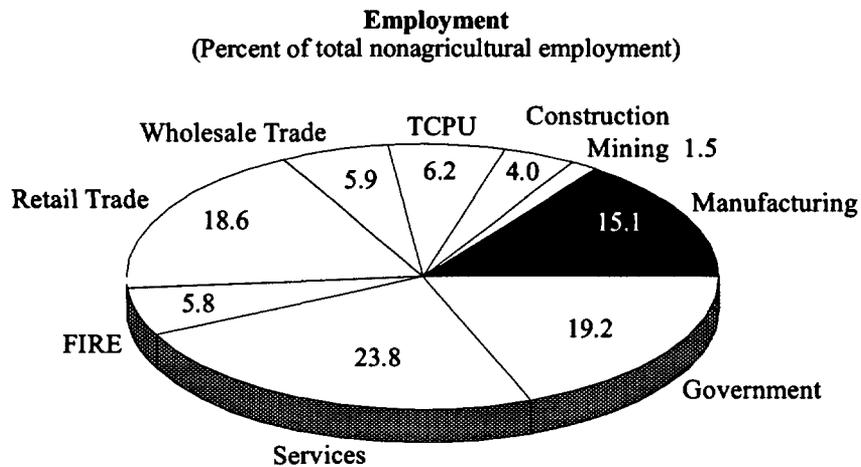
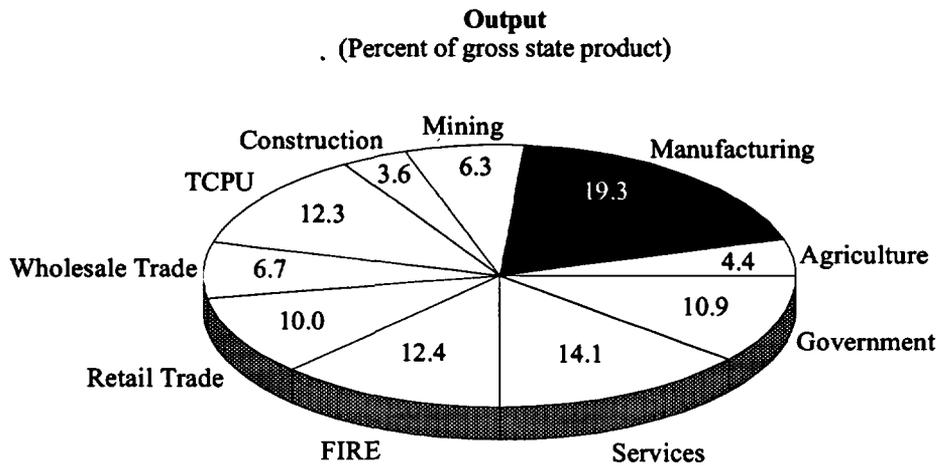
A handful of durable goods industries are primarily responsible for these large shares of district manufacturing output and employment. Transportation equipment and industrial machinery contribute the most to the district's manufacturing output, followed by electronic equipment and fabricated metals.

The largest durable goods industry in the district is transportation equipment. This industry, which includes automobile and aircraft manufacturing, generated over \$10 billion in real output and employed over 168,000 workers in 1989. The transportation equipment industry thus accounts for the largest share of the district's manufacturing activity—19.8 percent of its manufacturing output and 14.9 percent of its factory jobs. Compared with the nation, the district depends far more on transportation equipment for both factory jobs and output.

District manufacturing also depends heavily on industrial machinery. This industry, which produces goods ranging from grain drills to computer disk drives, turned out \$9.4 billion in real output and employed about 121,000 workers in 1989. Measured by its 17.7 percent share of the region's manufacturing output and its 10.8 percent share of factory jobs, the importance of the industrial machinery industry to the district's manufacturing sector is roughly the same as it is to the nation's.

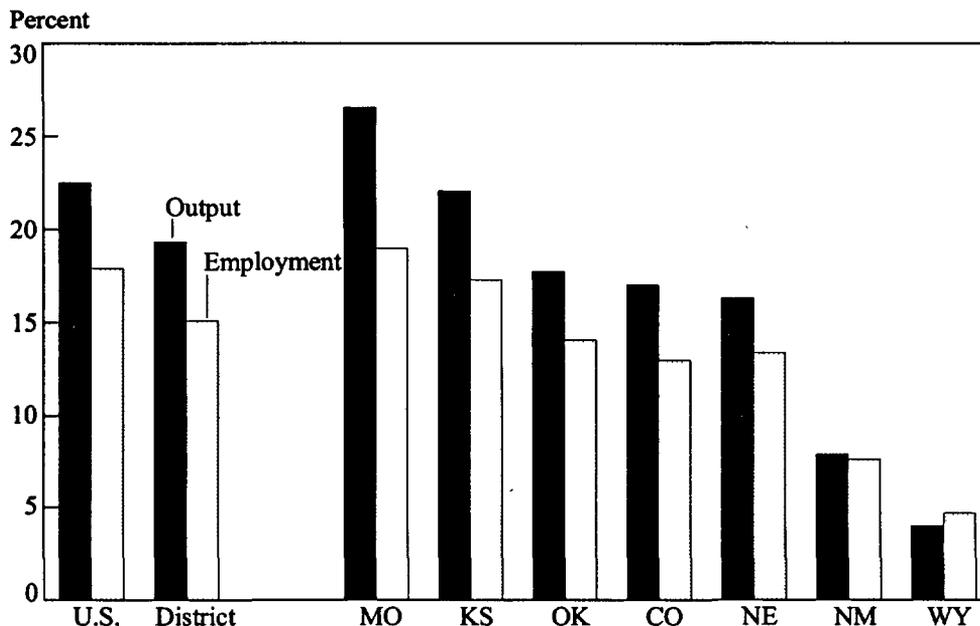
Two other durable goods industries are somewhat less important—fabricated metal products and electronic equipment. The fabricated metal industry, which makes products ranging from prefabricated metal buildings to pipe fittings for the energy and chemicals industries, accounts for about 5.8 percent of the district's manufacturing output and 8.0 percent of its factory jobs.

Chart 1
Economic Activity in the Tenth District



Source: U.S. Department of Labor and U.S. Department of Commerce.

Chart 2
Manufacturing Share of Output and Employment 1989



Source: U.S. Department of Commerce and U.S. Department of Labor.

The electronic equipment industry, which produces an assortment of goods from low-tech motors and generators to high-tech semiconductors, accounts for 8.1 percent of the district's manufacturing output and 7.3 percent of its factory jobs.

Nondurable goods industries

Nondurable goods production makes up a much smaller part of the district's manufacturing activity than durable goods production. Nondurable goods industries account for about 37 percent of both manufacturing output and employment in the district.

Table 1 shows that nondurables as a whole are overshadowed by durables in the district's mix of industrial output. Still, one nondurable goods industry—food processing—stands out as a key manufacturing industry in the district. Food and kindred products represent 11 percent of the district's manufacturing output and employment, the second largest share of jobs and the third largest share of output among the district's manufacturing industries. Moreover, the district's manufacturing sector depends much more heavily on food processing, both in terms of employment and output, than the nation's manufacturing sector.

Food processing is the only major nondurable goods industry in the district. But two other

Table 1

Manufacturing Employment and GSP Shares, 1989*(Percent of total manufacturing)*

<u>Industry</u>	<u>Employment</u>		<u>GSP</u>	
	<u>U.S.</u>	<u>District</u>	<u>U.S.</u>	<u>District</u>
<i>Durable Manufacturing</i>	55.8	57.6*	62.8	62.7
Lumber and wood products	3.7	2.4	2.8	1.5
Furniture and fixtures	2.7	1.7	1.3	1.0
Stone, clay, and glass products	2.7	1.7	1.3	1.0
Primary metal industries	3.8	2.5	4.0	2.2
Fabricated metal products	7.8	8.0	7.1	5.8
Industrial machinery and equipment	10.1	10.8	18.8	17.7
Electronic and other electronic equipment	8.3	7.3	9.8	8.1
Transportation equipment	9.5	14.9*	12.0	19.8
Instruments and related products	5.1	5.1	2.9	2.6
Miscellaneous manufacturing industries	2.0	1.6	1.7	1.1
<i>Nondurable Manufacturing</i>				
Food and kindred products	7.4	11.1	7.6	10.9
Tobacco products	.2	.0	.3	.0
Textile mill products	3.5	.3*	1.8	.1
Apparel and other textile products	5.5	3.7*	2.4	1.7
Paper and allied products	3.2	2.3	3.6	2.3
Printing and publishing	7.9	9.7	4.9	5.5
Chemicals and allied products	4.4	3.5	8.2	7.8
Petroleum and coal products	.6	.8*	4.8	4.7
Rubber and miscellaneous plastics products	4.6	4.7*	3.3	3.7
Leather and leather products	.6	1.3*	.3	.7

Source: U.S. Department of Commerce.

Note: Industry classifications are at the two-digit SIC level. Employment shares do not add to 100 because the Administrative and Auxillary category has been omitted from the table and because starred (*) numbers are estimates based on midpoints of ranges given for suppressed data.

nondurable goods industries—printing and publishing and chemicals and allied products—stand out among the other relatively small nondurable goods industries listed in Table 1. Printing and publishing's 9.7 percent share of factory jobs is significant, although its share of total manufacturing output is relatively small.³ By contrast, the chemical industry produces 7.8 percent of the district's manufacturing output, while providing a relatively small share of factory jobs.

THE DISTRICT'S KEY MANUFACTURING INDUSTRIES

A closer look at the district's three key manufacturing industries—transportation equipment, industrial machinery, and food processing—is needed to more fully understand how they shape the current and prospective performance of the region's manufacturing sector. While detailed output data are not available, the employment data in Table 2 show which manufacturing activities make up the key industries and how important these activities are to individual district states.⁴

Transportation equipment

The district's transportation equipment industry is dominated by three main categories of goods—motor vehicles, aircraft, and aerospace (Table 2). These three categories account for almost all of the transportation equipment jobs in the district. Moreover, the manufacturing sector in the district derives a larger share of its employment from each of these activities than in the nation.

Aircraft production provides the largest number of transportation equipment jobs in the district. The 88,000 workers engaged in fabricating aircraft and parts represent 7.8 per-

cent of the district's manufacturing jobs. The district, in fact, is a major aircraft producing region, accounting for 14.4 percent of the nation's aircraft jobs.

Aircraft production is a major source of jobs in two district states. In Kansas, aircraft-related manufacturing accounts for more than a fifth of the state's factory jobs. In Missouri, 8.5 percent of the manufacturing workforce is engaged in this activity. Missouri relies heavily on military aircraft. Kansas relies heavily on general aviation and commercial aircraft. Aircraft production also is a notable source of jobs in New Mexico and Oklahoma.

Motor vehicles is the second biggest segment of the district's transportation equipment industry.⁵ Six automobile or truck assembly plants across the district states employ 4.8 percent of the district's manufacturing workforce. Missouri is home to four of those plants and thus depends most heavily on the production of motor vehicles and related parts. This segment of the transportation equipment industry employs 6.8 percent of the state's factory workers. Oklahoma has only one auto plant and less than half as many workers as Missouri engaged in producing motor vehicles and parts, but its much smaller manufacturing sector is nearly as dependent on motor vehicle production. Production of motor vehicles and parts also accounts for modest shares of manufacturing jobs in Kansas, which has one automobile assembly plant, and in New Mexico, which has none.

Aerospace is the third notable segment of the district's transportation equipment industry. This segment, which includes guided missiles, space vehicles, and parts, accounts for only 2.2 percent of the district's manufacturing employment. But aerospace is quite important in Colorado where 9.3 percent of factory workers are engaged in some type of aerospace manufacturing. Missouri has a reputation as a home to aerospace because of its strength in related aircraft production. Yet aerospace directly pro-

Table 2

Key Manufacturing Industries in the Tenth District, 1989*(Percent of total manufacturing)*

Industry	U.S.	District	Colorado	Kansas	Missouri	Nebraska	New Mexico	Oklahoma	Wyoming
Transportation equipment	9.5	15.0*	9.3*	25.7	16.6	5.1	11.1	11.5	4.5*
Motor vehicles and equipment	3.8	4.8*	1.1	3.4	6.8	3.2	4.6*	6.5	.0
Aircraft and parts	3.1	7.8*	.7	21.1	8.5*	.4*	4.6*	4.1	.7*
Ship and boat building and repairing	1.0	.4*	.0	.3	.7	.1*	.0*	.3	.1*
Railroad equipment	.1	.1*	.0*	.2*	.1	.0*	.0	.1*	.0
Motorcycles, bicycles, and parts	.0	.0*	.0	.0*	.0*	.0	.0	.0*	.0
Guided missiles, space vehicles	1.1	2.2*	9.3*	.0	1.7*	.0	.5*	.0	.0
Miscellaneous transportation equipment	.3	.4*	.0	.7	.1	1.5	.2*	.5	2.1*
Industrial machinery and equipment	10.1	10.8	14.7	12.0	6.9	11.6	7.0	15.8	12.7
Engines and turbines	.5	.4*	.9*	.0*	.2*	.0	.0	1.1*	.0
Farm and garden machinery	.5	1.1*	.4*	2.6	.3	4.9	.2*	.2*	.1*
Construction and related machinery	1.1	1.7*	1.1	2.2	.7	1.0	1.0	5.4	4.1
Metalworking machinery	1.5	.7	.8	.7	1.0	.4	.3	.4	.0
Special industry machinery	.9	.7*	.5	1.1	.6	.5	.2*	.9	.1*
General industrial machinery	1.3	1.3*	.7	1.1	1.1	1.1	.5	2.9	.7*
Computer and office equipment	1.7	1.9*	8.4	.9*	.2*	.1*	2.0*	1.6	2.1*
Refrigeration and service machinery	1.0	1.2*	.4	1.5	1.6	.4*	.2*	1.3	2.1*
Industrial machinery, n.e.c.	1.7	1.9	1.8	2.2	1.3	3.3	2.7	2.1	3.9
Food and kindred products	7.4	11.1	11.0	13.3	8.5	24.8	8.6	7.8	9.9
Meat products	1.8	4.3	3.3	6.9	2.4	15.2	1.6	1.9	.3
Dairy products	.7	.9*	.8	.6	1.1	1.0	1.0*	.7	2.1*
Preserved fruits and vegetables	1.0	.7*	.4*	.9*	.6	1.8*	.4	.8	.1*
Grain mill products	.5	1.3*	.7	1.8	1.1	3.2	.5	.8	.7*
Bakery products	1.1	1.2*	1.4	1.4	.9	1.5	2.0*	1.3	.1*
Sugar and confectionery products	.5	.4*	.4*	.2*	.3	.4*	.4	.5*	4.5*
Fats and oils	.1	.2*	.1*	.3	.1	.5	.1	.2*	.0
Beverages	.8	1.6*	4.0*	.5	1.4	.6	1.0	1.3	2.1*
Misc. food and kindred products	.8	.7	.8	.9	.5	.8	1.4	.4	1.2

Note: Industry classifications are at the three-digit SIC level. Shares for individual product categories do not add up to industry shares due to estimates. (*) Estimates are based on midpoints of ranges given for suppressed data.

Source: U. S. Department of Commerce, "County Business Patterns."

vides only a small share of Missouri's manufacturing jobs.

Industrial machinery and equipment

The district's output of industrial machinery is spread across a larger number of products than its output of transportation equipment (Table 2). In fact, no single segment of the industry accounts for more than 2 percent of total manufacturing employment. Several product categories, however, are important in their home states. By this criterion, leading segments of the industrial machinery industry are computer equipment, construction machinery, and farm machinery. In addition, a category of miscellaneous industrial equipment accounts for significant shares of jobs in several district states. Employment in each of these industry segments is more concentrated in the district than in the nation.

Computer equipment is the largest segment of the district's industrial equipment industry. Makers of computer equipment employ about 22,000 workers, or 1.9 percent of manufacturing workers in the district. The lion's share of these jobs is in Colorado, where production of computers, storage devices, and other computer peripheral equipment in the Front Range cities accounts for 8.4 percent of the state's manufacturing employment.

Production of *construction machinery* is nearly as important to the district's manufacturing sector as the computer industry. Construction machinery includes equipment used in mining and in oil and gas drilling. Thus, the highest concentrations of employment in this category are in Oklahoma, Wyoming, and Kansas, the district's biggest producers of oil, natural gas, and coal. For example, makers of construction machinery in Oklahoma employ 5.4 percent of the state's manufacturing workforce.

Farm machinery is another notable segment of the industrial machinery industry. While the

region's manufacturing sector depends very little on farm and garden machinery overall, this category accounts for a much larger share of manufacturing employment in the district than in the nation. Moreover, the manufacturing sectors in Nebraska and Kansas rely on farm and garden machinery producers for significant shares of employment—4.9 percent in Nebraska and 2.6 percent in Kansas.

A category of *miscellaneous industrial machinery* accounts for the same number of manufacturing jobs as computer equipment, but is more evenly distributed across district states. All district states derive a significant share of their manufacturing jobs from this category, which includes such products as fluid power cylinders and pumps, and scales and balances not used in laboratories.

Food processing

The district's important food processing industry is dominated by a few product categories (Table 2). Meat products, grain mill products, bakery products, and beverages account for over three-fourths of the 125,000 food processing jobs in the district. In addition, the district's base of manufacturing jobs depends considerably more than the nation's on all of these categories except bakery products.

Meat products are the largest segment of the district's food processing industry. Consisting largely of meat packing plants, which process beef and pork, this segment employs nearly 50,000 workers across the district. At 4.3 percent of manufacturing employment, the share of meat-products jobs in the district is substantially greater than in the nation. Moreover, the manufacturing sectors in Nebraska and Kansas depend even more heavily on meat products. In Nebraska, meat-products plants employ about 15,000 workers, or 15.2 percent of manufacturing jobs. In Kansas, meat-products plants

employ roughly the same number of workers, but comprise a much smaller 6.9 percent share of the state's larger industrial job base.

The production of *beverages* is the second-largest segment of the district's food processing industry. Malt beverages, wines, distilled liquors, and bottled and canned soft drinks make up this segment, which accounts for 1.6 percent of district manufacturing jobs. Beverage production's strongest impact on manufacturing is in Colorado, where two large breweries help boost its share of manufacturing jobs to 4 percent. Across the other district states, employment in beverage production is generally smaller and varies widely.

Grain mill products are a more important part of manufacturing in the district than in the nation. This broad category includes flour, cereal breakfast foods, pet food, and prepared feeds, and accounts for 1.3 percent of the district's manufacturing jobs. These jobs are concentrated in Nebraska and Kansas, two of the nation's leading grain-producing states.

The *bakery products* segment of the food processing industry is a small, yet significant source of manufacturing jobs in most district states. Across the district, bakery products account for 1.2 percent of manufacturing jobs, about the same as in the nation. Five district states, however, depend more heavily than the nation on bakery products. Only Missouri and Wyoming have relatively insignificant shares of factory jobs based on bakery goods.

THE OUTLOOK FOR DISTRICT MANUFACTURING

The long-term outlook for manufacturing in the Tenth District depends largely on the performance of its key manufacturing industries. While smaller industries may prosper or decline in the years ahead, the district's large, well-established industries will be the major forces

influencing the manufacturing sector. The outlook for these key industries will be shaped in part by such factors as domestic and foreign economic growth, regional trade developments, and defense spending cuts.⁶

Transportation equipment

The outlook for the district's transportation equipment industry is mixed. Production of cars, trucks, and parts in the district may increase somewhat, while the aircraft industry faces formidable challenges in the years ahead.

Long-term prospects for the district's motor vehicles industry are good because its plants are among the most modern, technologically advanced facilities in the nation. Automobile and truck manufacturing may be boosted as the U.S. passenger car fleet ages and access to the rapidly expanding Mexican automobile market improves. New domestic models, such as Ford's new "world car" to be produced near Kansas City, will vie for new U.S. car sales with foreign manufacturers. And light trucks, assembled in Kansas City, are a rapidly growing segment of the motor vehicle market.

Prospects are less bright for the district's aircraft and aerospace manufacturers. The decline in defense spending is expected to continue throughout the decade, forcing makers of military aircraft and other aerospace hardware to continue to downsize their operations. Meanwhile, the financial problems of major airlines recently led to the announcement of massive job layoffs by district producers of commercial aircraft and parts over the next two years. Looking further ahead, improvement in the global economy later in the decade eventually should restore steady demand for airline and general aviation aircraft. For other aerospace manufacturers, the outlook depends on highly uncertain government funding for space exploration.

Industrial machinery and equipment

The outlook for the industrial machinery industry depends on both domestic and foreign economic growth. While district makers of computer storage devices are almost certain to benefit from the proliferation of computer technology during the 1990s, the prospects for other types of industrial equipment are less certain.

The vast array of computer equipment makes it difficult to assess the outlook for this category. These products range from microprocessors for personal computers to storage devices, such as hard disk drives and semiconductor memory chips. The market for computer equipment is expected to grow rapidly during the 1990s, but district manufacturers will continue to face stiff competition from abroad. One product category where U.S. manufacturers have held their ground against foreign competitors is storage devices. The prevalence of computer storage manufacturers in Colorado, therefore, bodes well for the district's computer equipment industry. District manufacturers of storage devices face a rapidly expanding domestic and international market as computer usage expands.

Prospects for manufacturers of *construction equipment* are likely to improve in the years ahead. Infrastructure building and replacement both here and abroad will help boost demand for construction machinery. Markets for mining equipment are expanding in developing countries. And while sales prospects for oil and gas field equipment will probably remain lackluster domestically, manufacturers can expect growth in overseas markets, especially in the oil-rich countries of the former Soviet Union.

The outlook for the district's *farm equipment* manufacturers is somewhat dim. Overcapacity is likely to remain a problem because most farm equipment is sold for replacement and growth in new sales is unlikely to expand rapidly. Exports may improve as modern farming techniques take hold in developing countries,

but domestic manufacturers must continue to compete with aggressive foreign manufacturers both overseas and in the U.S. market.

Food processing

Food processing in district states is likely to trend higher in the years ahead, with prospects for growth depending largely on product development, new technology, and exports to growing markets such as Mexico. State and local policymakers have made food processing—especially meat, grain milling, and bakery products—a target of their economic development efforts. However, distance from markets will remain an obstacle to more rapid expansion of the region's food processing activities.⁷

The important meat products segment of the district's food processing industry will likely prosper in the 1990s, even as U.S. consumers continue to substitute poultry for red meat in their diets. U.S. beef processing will continue to concentrate in the district, where the industry's most efficient plants turn out branded and other value-added products. Moreover, the region stands to gain from a more competitive pork industry, where a continuing trend toward common ownership of hog farms and processing plants will lead to lower costs and growing market share.⁸

Growth in the *beverage* segment of the food processing industry will probably be slow in the 1990s. Growth in the production of alcoholic beverages is likely to slow as health concerns curb domestic consumption. Stiff competition from foreign producers and potential increases in state and federal excise taxes could further dim the outlook for these beverages.

Grain mill products and *bakery products* are likely to remain a stable segment of the district's food processing industry. Demand for grain-based food products will likely improve in the 1990s as the USDA's new Food Guide Pyramid

encourages consumers to adjust their diets. This trend will boost grain mills in Kansas and Nebraska, even though they are distant from major markets for their products. Substantial growth in grain processing will depend to some extent on new transportation methods that will allow products to be shipped at lower cost. Meanwhile, bakeries across the district will continue to adjust their product mix to conform to consumers' healthier diets. Bakeries may also benefit from increased exports to the newly industrialized countries of east Asia, where wheat-based foods are becoming a more popular item in consumers' diets.

CONCLUSIONS

Despite its reputation for natural resource industries, the Tenth District's manufacturing sector is a major source of economic activity in the region. Manufacturing accounts for the largest share of the district's output, a much larger share than agriculture and mining combined. Moreover, the district's factories are important sources of jobs.

The manufacturing sector in the district is a collection of diverse industries, but three key industries dominate. Transportation equipment, industrial machinery, and food processing account for large shares of district output and employment. Within each of the key industries,

certain manufacturing activities stand out as important influences on the overall character of the key industries and the shape of the manufacturing sectors of individual states. For example, aircraft and automobiles are the most important components of the transportation equipment industry in Missouri, and meat products are the most important components of the food processing industry in Nebraska and Kansas.

The outlook for the district's manufacturing sector depends largely on the prospects for its key industries. The district's transportation equipment industry may be boosted by increased production of motor vehicles, but those gains are likely to be offset by a defense-related slowdown in aircraft and aerospace production. If domestic and foreign economic growth picks up, demand for the district's output of industrial equipment is also likely to pick up. Even under a less optimistic assumption about economic growth, the district's computer equipment manufacturers should benefit from the spread of computer technology expected to occur throughout the decade. The pace of growth in the food processing industry is likely to trend upward but will be limited by the pace of product development, technological change, and export growth. Overall, the outlook for the district's manufacturing sector looks promising as the slowdown in defense-related transportation equipment is likely to be balanced by gains in other key industries.

BOX

HIGH PAYING JOBS IN MANUFACTURING?

State and local policymakers often make manufacturing industries the target of their economic development efforts because these industries generally provide high paying jobs. Earnings across different manufacturing industries, however, vary considerably. Table A-1 shows the average hourly earnings in various manufacturing industries and in other major sectors of the U.S. economy. While manufacturing jobs pay more, on average, than retail, finance, and service jobs, they pay considerably less than industries such as mining and construction.

Within the manufacturing sector, earnings vary widely from industry to industry (Table A-1). Hourly earnings in durable goods industries average higher than in nondurable goods industries. The highest paying durable goods industry is transportation equipment, one of the Tenth District's key industries. Transportation equipment workers earn an average \$15.16 per hour. In contrast, workers in the furniture and fixtures industry earn only \$9.00 per hour.

Earnings among nondurable goods industries vary even more widely than among durable goods industries. At \$17.87 per hour, workers in the petroleum and coal products industry are the highest paid among workers in nondurable goods industries. The lowest paying manufacturing jobs are in the nondurable category of apparel and other textile products. Earnings in the district's important food processing industry are only slightly below the average for nondurable goods industries but are well below the average for all manufacturing industries.

Table A-1

**1992 Average Hourly Earnings
United States**

<u>Industry</u>	<u>Dollars per hour</u>
Total private	10.59
Mining	14.51
Construction	14.11
Manufacturing	11.45
Durable manufacturing	12.02
Lumber and wood products	9.43
Furniture and fixtures	9.00
Stone, clay, and glass products	11.64
Primary metal industries	13.67
Fabricated metal products	11.41
Industrial machinery and equipment	12.43
Electronic and other electronic equipment	11.01
Transportation equipment	15.16
Instruments and related product	11.93
Miscellaneous manufacturing industries	9.14
Nondurable manufacturing	10.71
Food and kindred products	10.19
Tobacco products	16.69
Textile mill products	8.60
Apparel and other textile products	6.95
Paper and allied products	13.09
Printing and publishing	11.75
Chemicals and allied products	14.45
Petroleum and coal products	17.87
Rubber and miscellaneous plastics products	10.37
Leather and leather products	7.40
Transportation and public utilities	13.49
Wholesale trade	11.40
Retail trade	7.14
Finance insurance and real estate	10.82
Services	10.54

Source: U.S. Department of Labor.

ENDNOTES

1 The Tenth District comprises Colorado, Kansas, Nebraska, Oklahoma, Wyoming, western Missouri, and northern New Mexico. Because most output and employment data used in this article are available only at the state level, this article looks at the region comprising the seven district states (often referred to as the district in this article) instead of the slightly smaller region defined by the Tenth District boundaries.

2 Estimates of gross state product (GSP) are published annually by the Commerce Department's Bureau of Economic Analysis. The GSP data are comprehensive measures of aggregate and industry output. For a detailed discussion of the benefits and uses of GSP data, see Miller 1989.

The most recent GSP data available are for 1989. Also, the most recent detailed employment data used elsewhere in this article are for 1989. Although aggregate employment data are available for more recent years, for comparability all data used in the article are for 1989.

3 See Miller 1993 for a detailed discussion of the district's printing and publishing industry.

4 This section uses three-digit employment data to

describe the reliance of district states on various segments of key industries. To avoid disclosure of data for individual firms, the County Business Patterns source suppresses employment levels for some industries in some states by giving only ranges. Where indicated, the shares in Table 2 have been estimated using the midpoints of these ranges. As a result, the profile of the district's key industries presented in this article should be viewed as an approximation based on limited data.

5 See Miller 1990 for a detailed discussion of the district's automobile industry.

6 The discussion of the long-term outlook for the district's key manufacturing industries is based largely on the U.S. Department of Commerce outlook for these industries (U.S. Department of Commerce).

7 For a complete discussion of the role of food processing in economic development of farm states, see Barkema, Drabenstott, and Stanley.

8 See Barkema for a discussion of the changes underway in the U.S. pork industry.

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