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Pieces of Eight

An Economic Perspective on the 8th District

THE FEDERAL RESERVE BANK of ST. LOUIS

THE EIGHTH FEDERAL RESERVE DISTRICT

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Pieces of Eight—An Economic Perspective on the 8th District is a quarterly summary of agricultural, banking and business conditions in the Eighth Federal Reserve District. Single subscriptions are available free of charge by writing: Research and Public Information Department, Federal Reserve Bank of St. Louis, Post Office Box 442, St. Louis, MO 63166. The views expressed are not necessarily official positions of the Federal Reserve System.

The Changing Role of Mining in The Eighth District

By Jeffrey D. Karrenbrock
David Kelly provided research assistance.

The Eighth Federal Reserve District is endowed with a variety of mineral deposits. The extraction of these minerals, which are key inputs for several industries, provides employment opportunities throughout the District. While the mining industry is still an important component of the Eighth District's economy, its relative economic contribution has fallen in recent years. Following a brief discussion of the U.S. mining industry, figures on the value of economic activity and employment statistics are used to describe the economic importance of mining in the Eighth Federal Reserve District.

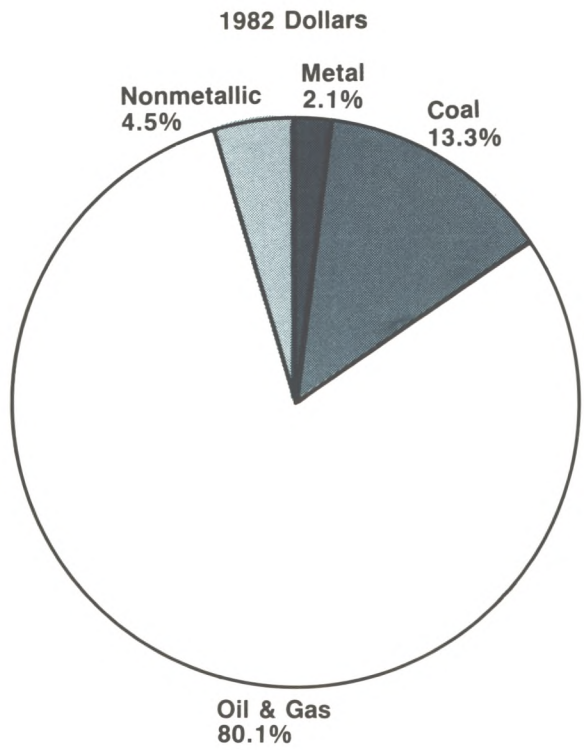
U.S. Mining Industry

As shown in figure 1, the U.S. mining industry is dominated by the oil and gas extraction sector, with coal, nonmetallic[1] mining and metal mining playing smaller roles in determining Gross Domestic Product (GDP), which is the total value of the goods and services produced in the United States during a given year. The mining industry's contribution to GDP is small relative to other industries. In 1986, for example, the mining industry accounted for 3.2 percent of GDP, while the manufacturing and service industries accounted for more than 22 percent and 15 percent, respectively.

Throughout the 1960s and early 70s, mining contributed slightly more than 5 percent of the nation's GDP, peaking at 5.6 percent in 1970. Since 1970, the contribution of the mining industry has gradually declined to its current level. Much of this decline can be traced to slowdowns in oil and gas extraction. Since 1963, the contribution of oil and gas extraction to GDP has fallen from 4.7 percent to 2.6 percent in 1986, accounting for more than 90 percent of the decrease in the mining industry's contribution to GDP.

While the mining industry's percent of GDP has fallen during the past 20 years, its real contribution has risen. Adjusting for inflation by using the price level in 1982 as the base, the industry contributed 15.7 percent more to GDP in 1986 than in 1963. Despite the industry's real growth, the relatively faster growth of other sectors of the economy has made the mining industry a less-important contributor to the nation's economy.

Figure 1
U.S. Mining Industry GDP in 1986



Source: Derived from U.S. Department of Commerce, Bureau of Economic Analysis data

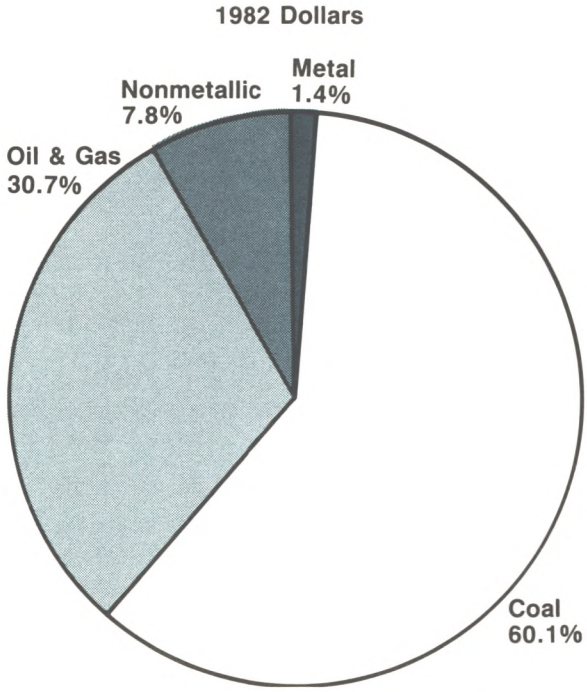
The mining industry's importance as an employer has also declined. In 1963 the mining industry employed about 1.1 percent of all nonagricultural workers. By 1988, this figure had fallen to 0.7 percent. Nonetheless, in 1988 the industry employed 100,000 more people than it did in 1963.

District Mining Industry

An industry's contribution to a state's economy can be described by its contribution to a state's Gross State Product (GSP). GSP can be viewed as the gross market value of the goods and services produced by a state's labor, capital and land net of purchases of intermediate products (i.e. materials) and services. Similar to the U.S. mining industry, the District's mining industry, as shown in figure 2, is dominated by the energy sectors,

Figure 2

District Mining Industry GSP in 1986



Source: Derived from U.S. Department of Commerce, Bureau of Economic Analysis data

followed by nonmetallic and metal mining. In contrast to the nation, coal mining is relatively more important than oil and gas extraction.

Similar to the U.S. mining industry, Eighth District mining is a relatively small and declining contributor to the value of GSP in the District (GSP8) (that is, the sum of all seven District states' GSPs). In 1986, the mining industry contributed 1.7 percent of GSP8. This compares to contributions from the manufacturing and service industries of 26.3 percent and 13.9 percent. The contribution of the mining industry to the District economy fell throughout the 1960s and 70s from its 1963 high of 3.3 percent, experienced a brief rebound in the early 1980s, and continued its decline thereafter.

Also following the national trend, the slowdown in oil and gas extraction has accounted for a large portion of the District's decline in mining. Between 1963 and 1986, the oil and gas extraction sector's contribution to GSP8 fell 1.73 percentage points, while nonmetallic and metal mining's contributions also fell slightly. Meanwhile, the coal mining sector has actually increased its contribution to GSP8 from 0.84 percent to 0.99 percent, and in 1974 coal mining replaced oil and gas extraction as the most important mining sector in the District.

In contrast to the nation's mining industry, the real value of the District's mining industry's contribution to GSP8 fell between 1963 and 1986. The oil and gas extraction sector accounted for all of the decline as its contribution fell about 60 percent between 1963 and 1986, while coal mining's contribution was up about 109 percent. Nonmetallic and metal mining's contributions rose less than 1 percent during this period. District mining employment has also fallen from a post-1963 high of 128,600 in 1979 to 88,000 in 1988. These workers accounted for about 0.6 percent of total nonagricultural employment in Eighth District states in 1986.

The importance of the mining industry varies across District states. The 1986 percent of total GSP contributed by the mining industry and its sub-sectors in each District state is shown in table 1. Of the seven District states, the mining industry is most important to Kentucky, where it accounts for more than 7 percent of the state's GSP. Kentucky also leads the District in absolute value with real output (1982 dollars) of more than $3.4 billion in 1986.

In the remaining District states, Illinois has the next-largest absolute output in mining; however, its mining sector only accounts for 1 percent of its GSP. Arkansas' mining sector, with a real output about one-third the size of Illinois', accounts for more than 2 percent of its GSP. Similarly, Mississippi's real output in mining is smaller than Illinois', but accounts for more than 3.5 percent of Mississippi's total GSP. The mining industry in Indiana, Missouri and Tennessee is small and relatively less important than in other District states. The following sections briefly discuss the importance of the different mining sectors within each District state.

Arkansas Mining

The mining industry's contribution to Arkansas' GSP has declined from almost 6 percent in 1963 to 2.3 percent in 1986. All of the mining sectors experienced relative, as well as absolute, declines in output. Even though oil and gas extraction accounted for the majority of the industry's decline, it remains the most important mining sector in Arkansas. Employment in the mining sector has also fallen from a post-1963 peak of 5,900 in 1982 to 4,200 in 1988. As a percent of total nonagricultural employment, mining employment has fallen from 1.2 percent in 1963 to 0.5 percent in 1988.

Table 1: The Mining Industry's Contribution to District States' GSP in 1986

	Mining Industry as a % of GSP	Metal Mining as a % of GSP	Coal Mining as a % of GSP	Oil & Gas Mining as a % of GSP	Nonmetal Mining as a % of GSP	Total GSP ($mill)[1]	Mining GSP ($mill)[1]
Arkansas	2.3%	.02%	0%	2.2%	0.08%	$ 28,168	$ 647
Illinois	1.0	0	0.65	0.26	0.1	183,849	1,843
Indiana	0.81	0	0.59	0.08	0.14	75,924	615
Kentucky	7.27	0	6.52	0.55	0.21	47,502	3,454
Mississippi	3.79	0	0	3.71	0.08	27,987	1,061
Missouri	0.4	0.11	0.13	0.03	0.14	72,629	292
Tennessee	0.58	0.05	0.25	0.1	0.19	64,124	371

[1]Deflated 1982 Dollars.
SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis.

Nonmetallic mining is Arkansas' second most important mining sector. Leading industrial minerals in terms of value include bromine, crushed stone, cement, and construction sand and gravel. With respect to the metal mining industry, the third most important sector, actual mining is limited mainly to bauxite. In 1986, the state ranked first nationally in output of bauxite, bromine and special silica stone for abrasive products (oilstones and whetstones) and second in crushed sandstone.[2]

Illinois Mining

In contrast to Arkansas where oil and gas extraction is the most important mining sector, coal is king in Illinois. In 1986, coal mining accounted for about 65 percent of the mining industry's total contribution to state GSP. Similar to other District states, the importance of mining in Illinois has fallen in recent years. In 1963, the mining industry provided 3.3 percent of the state's GSP, while in 1986 it accounted for about 1 percent. In 1977, the coal industry replaced the oil and gas extraction sector as the most important mining sector in the state. Coal mining has increased in real terms since 1963, while oil and gas extraction and nonmetallic mining have decreased.

Employment in the Illinois mining industry has fallen from a post-1963 peak of 31,300 in 1980 to 21,100 in 1988. Mining industry employment accounts for less than 1 percent of Illinois' total non-agricultural employment.

In addition to fuel minerals, Illinois also produces a variety of nonmetallic minerals. Leading commodities in order of value in 1986 were crushed stone, portland cement, construction sand and gravel, industrial sand and lime. Illinois was the nation's leading producer of fluorspar, industrial sand and tripoli in 1986.

Indiana Mining

The mining industry is small in Indiana relative to other District states. In 1986, the industry accounted for less than 1 percent of both Indiana's GSP and non-agricultural employment. Since 1963, mining has never accounted for more than 1.3 percent of the state's GSP.

While the level of economic activity in mining has remained relatively stable, the components have changed substantially. Similar to other District states, oil and gas extraction once dominated the mining sector. Since 1963, however, the real output of oil and gas extraction has fallen 78 percent while real coal output has increased 91 percent. Coal production now dominates the Indiana mining industry and, in 1988, Indiana accounted for about 3.3 percent of the nation's coal production. Production of nonmetallic minerals has remained relatively constant between 1963 and 1986. Although small in size, Indiana's nonmetallic sector led the nation in shipments of masonry cement and ranked second in sales of dimension stone in 1986.

Kentucky Mining

Coal mining dominates the mining industry in Kentucky. In 1986, the mining industry accounted for 7.3 percent of Kentucky's GSP; coal mining alone made up 6.5 percent of the state's GSP. Since 1963, coal mining's contribution to Kentucky's GSP has increased by about 2 percentage points, while oil and gas extraction's contribution has fallen about 2 percentage points. Kentucky is the nation's second-largest producer of coal, accounting for about 16.7 percent of total U.S. coal production in 1988. The state's large coal industry drives the demand for its non-fuel mineral production. Construction materials for highways and lime

and limestone used as rock dust and in acid mine drainage neutralization are essential in the transportation and production of coal. Limestone is the state's leading non-fuel commodity.

Kentucky's mining industry employment has fallen to 36,200 in 1988 from a post-1963 high of 54,500 in 1979. As a percent of total non-agricultural employment, mining employment has fallen from 4.3 percent in 1963 to 2.7 percent in 1988.

Mississippi Mining

Mississippi's mining industry is composed of oil and gas extraction and nonmetallic mineral production, with the oil and gas sector accounting for more than 95 percent of the state's mining GSP. Mississippi's mining sector's percentage of GSP has fallen more than any other District state. In 1963, the mining industry accounted for 14 percent of the state's GSP. By 1986, this figure had fallen to 3.8 percent. Both a decline in the oil and gas sector and an increase in other sectors of the economy helped to diminish this sector's role in Mississippi's economy. Employment in the mining industry was up slightly from 1963 levels in 1988, but down from a post-1963 high of 12,800 in 1981 to 6,300 in 1988. Employment in the mining industry accounts for about 0.7 percent of non-agricultural employment.

Mississippi is the District's largest producer of natural gas, accounting for about 1.1 percent of total U.S. production in 1987. In Mississippi's other important mineral sector, nonmetallic mining, construction activities both within Mississippi and in adjacent regions determine the output of the state's minerals operations. Its leading nonmetallic commodities include construction sand and gravel, cement, clays and stone. With respect to clay production, Mississippi ranked second nationally in 1986 in output of ball clay and bentonite.

Missouri Mining

Missouri's mining industry is the smallest of all District states in both real terms and as a percent of total GSP. The mining industry's contribution to GSP was about the same in 1986 as it was in 1963, slightly less than 0.5 percent. In 1986, the most important mining sector was nonmetallic mineral production followed by coal production, metal production, and oil and gas extraction. Until 1983, metal mining was the most important mining sector in the state. Despite its small size, Missouri's mining industry led the nation in the production of lead and was second in lime production in 1986.

Employment in Missouri's mining sector stood at 5,400 in 1988, down from a post-1963 high of 9,600 in 1969. Just as in 1963, the mining industry continues to account for less than 1 percent of the state's non-agricultural employment.

Tennessee Mining

Unlike most other District states, Tennessee's mining industry is not clearly dominated by one sector. Instead, coal production and nonmetallic mining share an important role in the industry's output, with coal being a bit larger. In 1986, the industry accounted for 0.6 percent of the state's GSP, compared to 0.8 percent in 1963. In terms of real output, Tenneessee's mining sector has actually increased its GSP by about 66.4 percent since 1963. The industry, however, has fallen off considerably since the late 1970s, with coal output declining the most. Employment in the mining industry fell from a 1978 peak of 10,800 to 6,400 in 1988, accounting for 0.3 percent of total non-agricultural employment in Tennessee.

While Tennessee is a relatively small producer of energy minerals, it was the nation's largest producer of zinc and the fourth-largest producer of phosphate rock in 1986. Most of Tennessee's nonmetallic mining industry is driven by the state's construction industry. Construction materials that were the most important to Tennessee in 1986 included crushed stone, sand and gravel, and clays.

Summary

Similar to the United States, a declining energy sector and growth in other industries has diminished the relative economic importance of the mining industry in the District. While fuel minerals still account for most of the District's mining industry, oil and gas extraction has been replaced by coal production as the most important mining sector in the District. The importance of the coal sector is reflected by the fact that District states produced more than 27 percent of the nation's coal in 1988. Although not as important in dollar terms as fuel minerals, District states are also leading suppliers of other key non-fuel minerals such as zinc and lead.

The mining industry's future contribution to the District's economy will likely continue to be small, and will be determined largely by the performance of the energy sectors. Two factors that will help determine energy mining's importance in the District economy are the future movements of oil and natural gas prices and the impact of the proposed Clean Air Act on the coal industry. Current conditions suggest that the District's metal mining sectors will continue to play a minimal role, while nonmetallic mineral production will continue to be tied to building and road construction.

[1]Nonmetallic minerals do not include fuel minerals.
[2]Some of the information provided about District states' mineral industries was taken from the U.S. Department of Interiors *1986 Minerals Yearbook*.

In Search of a Regional Economic Identity

by Thomas B. Mandelbaum

Thomas A. Pollmann provided research assistance.

Several areas of the United States have unique regional identities. New England, for example, is known for its high-tech manufacturing and tourism; the Great Lake States, for their production of cars and capital goods; and the "oil-patch" states, for their sizable energy sector. While such characterizations ignore the diverse realities of regional economies, they are useful in focusing on industries that are of particular importance and on developments that affect those industries.

The Eighth Federal Reserve District lacks a well-known regional identity. Through comparison of the relative size of various sectors of the District's economy with those of the national economy, this article attempts to identify the region's economic character and describe the broad sectoral shifts that helped shape its present form.

An Overview, 1963-86

The figure shows the broad changes between 1963 and 1986 in the industrial composition of the United States, the Eighth District and in four states. In this article, these four states — Arkansas, Kentucky, Missouri and Tennessee — are used to represent the District because they dominate economic activity. For each area, the figure shows the changing percentages of total economic output, as measured by Gross State Product, accounted for by three broad sectors: manufacturing, other goods production (agriculture, forestry, fisheries, mining and construction) and services production. Services production is a broad category including government, finance/insurance/real estate, wholesale and retail trades, transportation/utilities, health, business and miscellaneous services.

Throughout the period, the shares of total output contributed by service-producing sectors gradually increased in the United States and in Eighth District states, a continuation of a trend beginning in the late 19th century. Meanwhile, the shares of output accounted for by goods other than manufactured goods diminished, while the manufacturing share remained either roughly constant (as in the United States and Kentucky) or expanded (as in Arkansas, Missouri, Tennessee and the District).

The absence of any decline in manufacturing's share of national output is inconsistent with the widespread belief that the United States suffers from a serious erosion of its industrial base, sometimes called the "deindustrialization" of America. Much of this concern about the manufacturing sector stems from declining employment trends. Manufacturing employment declined sharply between 1979 and the early 1980s in both the nation and the District and, despite recent growth, has yet to equal 1979 levels. The share of U.S. wage and salary employment accounted for by manufacturing also has declined, dropping from approximately 30 percent to 24 percent between 1963 and 1979, and to 19 percent in 1986.

Rather than a sign of weakness, however, these trends reflect manufacturing's more rapid productivity growth, which allows it to produce a steady share of output with a decreasing share of the workforce. U.S. manufacturing productivity, measured by real output per hour, grew at a 2.6 percent annual rate between 1963 and 1986, while productivity in the nonfarm business sector rose at just a 1.4 percent rate. Previous research suggests that Eighth District manufacturing productivity growth has matched that of the nation since the early 1970s.[1]

The rapid productivity growth in manufacturing, as well as agriculture, has been a major source of U.S. consumers' rising affluence in the post-war period. It has allowed the price of goods to fall relative to those of services, indirectly increasing consumers' real incomes.[2] As real incomes have risen, consumers have tended to purchase a disproportionately large part of their additional income on services, rather than agricultural goods or manufactured products. Thus, the rapid productivity growth in manufacturing and agriculture has indirectly fueled the growth of services.

Regional Divergence

As the figure shows, the broad structure of the District economy was similar to the nation's in 1963. In fact, the largest difference between the 1963 output shares of services, manufactured goods and other goods was one-half of a percentage point. The regional and national structures have subsequently diverged, however, with a comparatively large District manufacturing sector, and a correspondingly smaller service-producing sector. What accounts for this divergence?

The slower growth in the District services share since 1963 is not because of its slower output growth. As table 1 shows, service-production

Figure 1

The Changing Composition of Output 1963-86

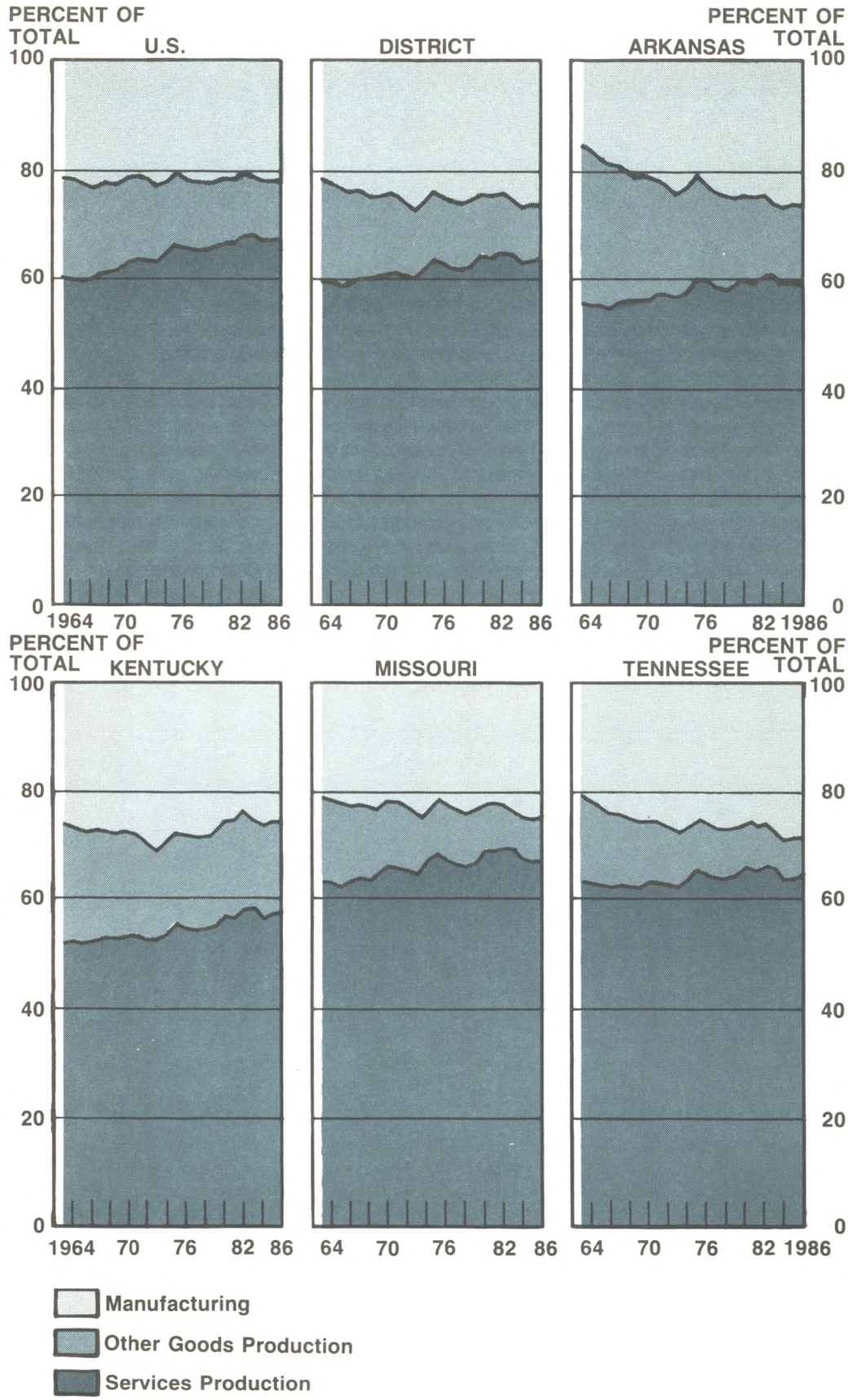


Table 1
Output Growth, Compounded Annual Rates, 1963-86

	Total	Manufacturing	Other Goods Production[1]	Services Production
United States	3.0%	3.2%	0.5%	3.5%
Eighth District	3.1	4.0	0.5	3.4
Arkansas	3.7	6.1	0.7	4.0
Kentucky	2.7	2.7	1.2	3.2
Missouri	2.6	3.3	−0.6	2.9
Tennessee	4.0	5.2	0.7	4.0

SOURCE: Figures were computed from U.S. Department of Commerce data.
[1]Includes agriculture, forestry, fisheries, mining and construction.

output increased at a rate only 0.1 percentage point slower in the District than in the nation between 1963 and 1986. Thus, the District is enjoying the rapid service-sector growth experienced in the rest of the nation. Since the other goods sector and total output also expanded at similar rates in the District and the nation, it is the faster-than-national growth of District manufacturing that is responsible for the divergence.

As the figure shows, manufacturing increased its share of output in Arkansas, Missouri and Tennessee since 1963, resulting in a slower shift toward service production than at the national level. In Arkansas and Tennessee, service-production growth exceeded the national average, but manufacturing grew even faster (see table 1). Kentucky differs from the nation and the other District states in that it experienced only a slight narrowing of its relatively large other goods sector.

To obtain a better understanding of these differences, we need to look beyond the three categories considered so far. The following section examines the region's economy at a more disaggregated level.

Regional Concentrations

The structural shifts that have taken place in the District since 1963 have created a region with a heavier concentration in manufacturing than in the nation and a correspondingly small service-producing sector. Table 2 provides a more detailed comparison of the industrial composition of the District and four states in 1986 with the national economy. The first column lists the percentage share that each industry contributed to total U.S. output. To facilitate comparisons with the national structure, subsequent columns list concentration indexes (CIs) that indicate the relative size of an industry in the District or state economy compared with its relative size in the national economy.

A CI, sometimes called a location quotient, is computed by calculating the ratio of the percentage share of total output contributed by a specific sector in the District or state divided by the percentage share that the sector represents of the nation's total output. This ratio is then multiplied by 100. Thus, if a sector accounts for the same percentage of District output as it does of U.S. output, the CI equals 100. Smaller figures indicate that the industry is relatively smaller in the regional than the national economy while CIs larger than 100 indicate a higher regional than national concentration. Very large CIs (130 or more) are indicated with bold type while small CIs (70 or less) are italicized.

The high CIs should be interpreted carefully. While a high CI indicates a high concentration relative to the national average, if the national sector is small, an industry with with a large CI may still only contribute a small portion of the region's output. For example, the tobacco industry provided only 1.625 percent of Kentucky's output, but because the national average is 0.19 percent, Kentucky's tobacco CI was 855 ([1.625 ÷ 0.19]x100). To focus on the most important industries, table 2 excludes subsectors that failed to contribute at least 1 percent of the 1986 output of the nation, the District or one of the four states.

Goods Production

Among the 10 major divisions of the District economy, the agriculture, forestry and fisheries sector had the highest relative concentration, evidenced by its 139 CI, while manufacturing was second with 119. No other division had a concentration substantially above the national average. Although the District agricultural sector is larger than at the national level, the mining and construction sectors are relatively smaller. Thus, the other

Table 2
U.S. Industrial Composition and Concentration Indexes for District and States, 1986

Industry	U.S. (percent of total)	District CI	AR CI	KY CI	MO CI	TN CI
Goods Production						
Agriculture, forestry, fisheries	2.7%	**139**	**270**	**161**	121	86
Farms	2.3	**149**	**301**	**173**	129	89
Mining	3.2	*70*	72	**227**	*13*	*18*
Coal mining	0.4	**370**	*0*	**1532**	*30*	*58*
Oil and gas extraction	2.6	*18*	86	*21*	*1*	*4*
Construction	4.6	95	103	103	89	92
Manufacturing	22.1	119	120	117	112	128
Durable goods	14.1	110	106	104	111	115
Lumber and wood products	0.6	113	**330**	80	*51*	111
Primary metals	1.0	95	107	**132**	72	89
Fabricated metals	1.5	112	**131**	79	94	**150**
Nonelectrical machinery	4.1	96	82	125	*57*	125
Electrical equipment	2.3	109	**137**	109	113	93
Transportation equipment	2.5	**144**	*45*	94	**258**	94
Motor vehicles	1.2	**181**	*52*	**181**	**272**	**136**
Other transportation equipment	1.3	109	*37*	*14*	**246**	*56*
Nondurable goods	8.0	**134**	**144**	**139**	114	**150**
Food and kindred products	1.7	**164**	**207**	**177**	**157**	**143**
Tobacco products	0.2	**218**	*0*	**855**	*1*	86
Apparel and textile products	0.5	**163**	104	**157**	90	**275**
Paper and allied products	0.8	**143**	**285**	87	97	**173**
Printing and publishing	1.1	102	94	109	109	92
Chemicals and allied products	1.6	126	*52*	95	**149**	**156**
Petroleum and coal products	0.7	*59*	**146**	82	*43*	*21*
Rubber and plastic products	0.7	**167**	**217**	**172**	89	**230**
Services Production						
Transportation and utilities	8.9	101	110	92	119	84
Transportation	3.5	123	114	103	**140**	124
Railroads	0.5	**178**	**225**	**209**	**176**	**136**
Trucking and warehousing	1.5	**139**	**158**	120	**140**	**143**
Air transportation	0.7	120	*21*	*39*	**173**	**165**
Communication	2.6	97	90	74	120	90
Utilities and sanitary services	2.8	78	123	96	93	*28*
Wholesale trade	7.7	91	76	*70*	101	103
Retail trade	9.8	108	106	97	108	115
Finance, insurance and real estate	15.0	90	85	90	95	86
Banking	1.7	118	129	**138**	123	94
Insurance carriers	1.0	82	*51*	71	97	85
Real estate	10.7	86	82	88	87	86
Other services	15.3	87	72	71	98	92
Business services	3.5	73	*49*	*43*	94	82
Health services	4.5	107	95	100	110	113
Legal services	1.0	*69*	*54*	*63*	85	*62*
Miscellaneous services	1.5	*64*	*46*	*51*	78	*65*
Government	10.7	94	87	98	87	103
Federal civilian	2.3	117	*58*	99	108	**165**
Federal military	1.3	80	91	**150**	*61*	*45*
State and local	7.0	89	96	87	84	93

NOTE: Figures were computed from Department of Commerce data. Concentration indexes of 130 or greater are in bold type while those of 70 or less are in italics.

goods sectors accounted for similar shares of District and U.S. output in 1986.

The high District concentration in agriculture, forestry and fisheries was due to high farm shares in Arkansas, Kentucky and Missouri. Missouri's comparatively large farm output is derived from soybean and corn production, mainly in the fertile northern plains, as well as cattle and hog production in central and southwestern areas of the state. The Kentucky farm sector is dominated by two rather specialized products, tobacco and horses, including racing thoroughbreds.

The poultry industry is largely responsible for Arkansas' comparatively sizable farm sector (as well as the state's large food processing sector). Poultry production developed in rural Arkansas where the climates were mild and the land was less suited to more profitable agriculture pursuits, such as crop production. Large-scale poultry processors became established as they assumed the role of feed suppliers and provided a guaranteed market for growers. Besides poultry, the production of rice and soybeans in eastern Arkansas is an important component of the state's farm sector.

Manufacturing produced 26.5 percent of the 1986 District output, resulting in a CI of 119, up from 102 in 1963. The sector is characterized by a specialization in nondurables. In 1986, the District's nondurables CI was 134, about the same as the 1963 figure. The high concentration of several regional nondurables sectors (food processing, tobacco and paper production) reflects the importance of regional agriculture and natural resources. Food processing, with its 164 CI, is especially important in determining the nondurables orientation of District manufacturing. The high CIs in Arkansas, Kentucky and Missouri reflect the importance of their farm sectors. Beer and whiskey production in Missouri and Kentucky, respectively, are also significant factors.

Other nondurables industries in the District that have high CIs include rubber/plastics and apparel producers. Much of the rubber/plastics output is in the form of tires shipped to vehicle assembly plants in the region. Apparel makers, which require large numbers of relatively low-skilled workers, are attracted by the low wages found in many parts the District.

Growth in durables manufacturing since 1963 was largely responsible for District manufacturing's increasing share of output and for the jump in manufacturing's CI since 1963. The District durables CI rose from just 81 in 1963 to 110 in 1986. Except for the lumber and wood products sector, for which there was no change, each District durables subsector experienced a substantial increase in its CI since 1963. The transportation equipment sector has become one of the region's leading industries, largely due to gains in Missouri. In addition to extensive motor vehicle production, also found in Kentucky and Tennessee, Missouri is a major producer of military aircraft, mainly by the McDonnell-Douglas Corporation in St. Louis.

One implication of the District's comparatively high concentration in durables production, particularly consumer durables like autos and household appliances, is that the District economy may experience a disproportionately severe downturn if the national economy has a recession. It is also likely that lumber and wood products, used in home construction, would be hard hit. Several other leading District manufacturing sectors, however, including food processing and military aircraft, are not particularly sensitive to national business cycle fluctuations.

Construction and mining were underrepresented in the District economy in 1986 compared with the nation. While construction's relative size was just slightly below the national average, District mining's CI indicates the District share is only 70 percent of the national average of 3.2 percent. Coal mining was comparatively important, however. The heavy District concentration stemmed from coal mining's almost 7 percent contribution to Kentucky's output.[3]

Service Production

The relatively small share of service-production in the District economy shown in the figure is reflected in the generally low CIs of service-producers in table 2. Among the six major service-producing sectors, only transportation/utilities and retail trade have CIs greater than 100. The strength of the transportation/utilities sector stems from its transportation subsector, which is relatively concentrated in each of the states. The size of rail and trucking reflects the region's central location and extensive interstate highway and rail systems. Also, air transportation is comparatively large in Missouri and Tennessee, largely because Trans World Airlines and Federal Express have major hubs in St. Louis and Memphis, respectively.

The low CIs for the finance, insurance and real estate and the other services sectors contributed heavily to the low concentration of service-production in the District. Real estate, which accounts for most of the finance, insurance and real estate sector's output, was underrepresented in each of the four states. The District's other services sector is characterized by a relatively large health services portion, but weaker concentrations in business, legal and miscellaneous services.

Conclusion

The Eighth District economy has experienced a shift away from agriculture, mining and construction since the early 1960s as both service-producing industries and manufacturing account for growing shares of output. Although the general structures of the regional and national economies were quite similar in 1963, by 1986 the District's economy was characterized by a relatively small service-producing sector and relatively large manufacturing and farming sectors. This reflects the more rapid regional expansion of manufacturing relative to services and the fact that agriculture, despite declining in a relative sense, has remained more important in the District than in the nation.

The District has particularly heavy concentrations in the production of motor vehicles, military aircraft and food products. No industry or resource, however, dominates the District's economy, so it is difficult to define a unique regional identity for the District. One benefit of this region's economic diversity, however, is that its economic fortunes are not overly dependent on a single industry, which could lead to a severe regional contraction if the industry faltered.

[1]See Thomas B. Mandelbaum, "Is Eighth District Manufacturing Endangered?" Federal Reserve Bank of St. Louis *Review* (November 1987), p.12.

[2]The U.S. price of goods fell from 136.1 percent of the price of services in 1964 to to 88.1 percent in 1986. See Mack Ott, "The Growing Share of Services in the U.S. Economy—Degeneration or Evolution?" Federal Reserve Bank of St. Louis *Review* (June/July, 1987), p. 12.

[3]See the first article in this issue of *Pieces of Eight* for a comprehensive look at District mining.

Commercial Real Estate Lending—A Growing Banking Risk

by Lynn M. Barry

Thomas A. Pollmann provided research assistance.

Real estate loan problems in Texas, Oklahoma and other energy states have been well-publicized. Except in the economically depressed Southwest, however, commercial real estate lending has been a profitable activity for banks in recent years, with margins often exceeding those on traditional business loans. In addition, loan quality problems have not been widespread. Nonetheless, lenders and regulators in some regions of the United States have become concerned by developments suggesting that loan problems may arise.

High vacancy rates for office buildings, shopping centers, condominiums, apartments and hotels suggest an oversupply of virtually every type of commercial real estate. This excess supply has raised fears that new projects will not generate sufficient income needed to make loan payments and that many developers will not meet their debt service requirements.

Weak market conditions have caused some of the region's banks to reduce their emphasis on commercial real estate lending. While Texas-type disasters are unlikely for Eighth District banks, damage to banks' earnings are possible. In an effort to assess risk exposure, this article looks at recent developments in commercial real estate lending for banks in the Eighth Federal Reserve District.[1]

Recent Developments

Similar to bank lending trends nationally, the Eighth District banking industry has markedly increased its commercial real estate lending in recent years, partly to offset an exit by corporations from business loans to commercial paper and other banking products. For the purposes of this article, commercial real estate loans include: domestically booked construction and land development loans, loans secured by multi-family (five or more) residential properties and loans secured by nonfarm nonresidential properties.

As shown in table 1, commercial real estate loans accounted for 10.04 percent of total District bank assets at the end of 1988, up from 8.59 percent at the end of 1986. Eighth District banks boosted their commercial real estate loan holdings from $9.9 billion in 1986 to $12.4 billion in 1988, an increase of more than 25 percent.

Table 1
Commercial Real Estate Loans to Total Assets at Eighth District Commercial Banks by Location and Asset Size (Year-ends 1986 - 1988)

	1988	1987	1986
Eighth District	10.04%	9.57%	8.59%
Arkansas	10.09	10.05	9.57
Illinois	8.16	7.57	6.51
Indiana	7.42	6.71	6.49
Kentucky	7.29	7.41	6.75
Mississippi	7.34	7.39	7.75
Missouri	13.62	12.27	10.70
Tennessee	10.46	10.44	8.59
District Banks			
< $25 million	5.42	5.08	4.79
$25 million - $50 million	7.13	6.71	6.15
$50 million - $100 million	8.62	8.36	8.04
$100 million - $300 million	11.78	11.55	10.14
$300 million - $1 billion	12.22	11.30	9.57
$1 billion - $10 billion	10.47	10.24	9.22

NOTE: Data are for that portion of the state located within the Eighth District.
SOURCE: FDIC Consolidated Reports of Condition and Income, 1986-1988.

Among Eighth District states, Missouri banks reported the highest dollar volume of commercial real estate loans. At year-end 1988, these banks held slightly more than $4.8 billion in commercial real estate loans. In comparison to 1986 figures, total commercial real estate loans jumped $1.2 billion, an increase of 33.8 percent. For commercial banks in the District portion of Tennessee, commercial real estate loans totaled $1.69 billion in 1988, up 35.2 percent from 1986. Meanwhile, for commercial banks in Arkansas, commercial real estate loans totaled $1.87 billion in 1988, an increase of 8.7 percent from 1986. Commercial banks in the District portion of Kentucky had commercial real estate holdings of $1.74 billion in 1988, an increase of 20.8 percent from 1986.

Table 1 also shows that at the larger District banks, commercial real estate lending tends to account for a larger percentage of their asset base. For those banks with assets between $300 million and $1 billion, commercial real estate loans, on average, accounted for slightly over 12 percent of total assets in 1988. By the end of 1988, commercial real estate loans accounted for more than 20 percent of total assets at five of the top 20 United States banks in the commercial real estate lending field. These top 20 banks increased their holdings 24 percent from 1986 to 1987 and 12 percent from 1987 to 1988.[2]

As shown in table 2, the largest District banks (those with assets exceeding $1 billion) increased their holdings of commercial real estate loans from $655 million in 1986 to slightly more than $1 billion in 1988, an increase of more than 58 percent. For these banks, the nonfarm nonresidential component of commercial real estate loans rose 85.8 percent, from $310.6 million in 1986 to $577 million in 1988. Construction loans also rose sharply during the past few years with volume up 44.8 percent from 1986 and 28.9 percent from 1987. Multifamily was the only loan category showing a decrease in the three years presented in the table, dropping 9.3 percent from 1986 and 18.8 percent from 1987.

Table 2
Commercial Real Estate Loans Outstanding at District Commercial Banks with Assets Between $1 Billion and $10 Billion (Year-ends 1986 - 1988)

	Construction	Multi-family	Nonfarm nonresidential	Total
1988	$391.6	$67.0	$577.0	$1,035.6
1987	303.8	82.5	449.2	835.5
1986	270.5	73.9	310.6	655.0

NOTE: Dollar amounts are in millions.
SOURCE: FDIC Consolidated Reports of Condition and Income, 1986-1988.

Table 3
Nonperforming Real Estate Loans as a Percent of Total Real Estate Loans Outstanding By Location and Asset Size[1] (Year-ends 1986 - 1988)

	1988	1987	1986
United States	2.51%	2.89%	2.81%
Eighth District	1.58	1.83	2.17
Arkansas	2.39	3.26	3.70
Illinois	2.05	2.45	2.87
Indiana	1.23	1.25	1.62
Kentucky	1.24	1.57	2.24
Mississippi	1.19	1.16	1.44
Missouri	1.37	1.39	1.43
Tennessee	1.55	1.48	1.90
District Banks			
< $25 million	1.85	2.19	2.65
$25 million - $50 million	1.74	2.07	2.61
$50 million - $100 million	1.69	2.05	2.31
$100 million - $300 million	1.54	1.58	1.74
$300 million - $1 billion	1.37	1.82	3.21
$1 billion - $10 billion	1.52	1.67	1.55

[1]In addition to commercial real estate loans, this category includes loans secured by farmland and loans secured by one-to-four family residential properties.

NOTE: Data are for that portion of the state located within the Eighth District.
SOURCE: FDIC Consolidated Reports of Condition and Income, 1986-1988.

Loan Quality

Basically, bank real estate loans can be divided into the following categories: 1) one-to-four family (residential) permanent mortgages, 2) farmland, 3) construction and land development, 4) nonfarm nonresidential mortgages, and 5) multifamily mortgages. As previously defined, the commercial component of real estate lending includes the last three categories.

In terms of default risk, residential mortgages generally carry the lowest level of risk while construction carries the bulk of the risk associated with a bank's real estate loan portfolio. While part of banks' construction portfolios are loans to finance single-family homes, risk in this area is usually less than on commercial projects.

Commercial mortgage loans also carry risk. Once construction is complete, and if no long-term (permanent) take-out loan is available, most banks reclassify the loan as a commercial mortgage and grant a semi-permanent loan. These loans have an average maturity of three years and buy time until one of the following occurs: (a) full lease of the project or (b) a permanent loan is established. It is

Table 4
Real Estate Loan Losses as a Percent of Total Real Estate Loans Outstanding by Location and Asset Size[1] (Year-ends 1986 - 1988)

	1988	1987	1986
United States	0.37%	0.42%	0.39%
Eighth District	0.28	0.32	0.39
Arkansas	0.52	0.74	0.69
Illinois	0.29	0.27	0.66
Indiana	0.13	0.18	0.24
Kentucky	0.23	0.50	0.53
Mississippi	0.24	0.26	0.34
Missouri	0.24	0.16	0.17
Tennessee	0.23	0.21	0.26
District Banks			
< $25 million	0.29	0.38	0.66
$25 million - $50 million	0.21	0.31	0.57
$50 million - $100 million	0.23	0.30	0.47
$100 million - $300 million	0.22	0.31	0.38
$300 million - $1 billion	0.26	0.38	0.44
$1 billion - $10 billion	0.40	0.33	0.15

[1]In addition to commercial real estate loans, this category includes loans secured by farmland and loans secured by one-to-four family residential properties.

NOTE: Data are for that portion of the state located within the Eighth District.

SOURCE: FDIC Consolidated Reports of Condition and Income, 1986-1988.

typical that many commercial mortgage loans are really commercial business loans with real estate as collateral.

To measure loan quality, table 3 looks at the level of nonperforming real estate loans from 1986 to 1988.[3] Due to limitations in sorting the data by type of real estate loan, the following loan quality statistics are for those five loan categories discussed above.

At year-end 1988, nonperforming real estate loans totaled 1.58 percent of all real estate-secured loans for the District's 1,285 banks. That was down from 1.83 percent in 1987 and 2.17 percent in 1986. In comparison to averages for banks across the United States, Eighth District banks experienced lower nonperforming rates on real estate loans. Across virtually every District state, the ratio of nonperforming real estate loans has declined since 1986. This also holds true across the range of asset size categories.

Table 4 looks at District real estate charge-offs across states as well as charge offs for various asset categories of District banks. Losses on real estate loans fell from 0.39 percent of total real estate loans in 1986 to 0.28 percent in 1988. Across all asset size categories, except those with assets between $1 billion and $10 billion, real estate loan losses have declined from the high levels reported in 1986. For the largest District banks, however, real estate loan charge-offs rose from 0.15 percent of total real estate loans in 1986 to 0.40 percent in 1988. The overall figure for real estate charge-offs for the largest banks is an aggregate of relatively high losses on commercial real estate and relatively low losses on one-to-four family residential properties.

Conclusion

In terms of potential harm to bank earnings resulting from higher nonperforming loans and loan losses, commercial real estate lending is receiving increased attention by bankers and regulators. High vacancy rates suggest an excess supply of commercial real estate in the United States today, raising fears that new projects will not generate the income needed to make loan payments. Eighth District banks are not immune from this situation as commercial banks have increased their exposure in this type of lending. While District loan quality statistics do not yet reveal this problem, at stake are some very large potential increases in problem loans, especially if there is an economic slowdown or escalating interest rates.

[1]The Eighth Federal Reserve District consists of the following: Arkansas, entire state; Illinois, southern 44 counties; Indiana, southern 24 counties; Kentucky, western 64 counties; Mississippi, northern 39 counties; Missouri, eastern and southern 71 counties and the City of St. Louis; Tennessee, western 21 counties.

[2]*American Banker*, May 22, 1989.

[3]Nonperforming loans include those loans greater than 89 days pastdue, nonaccrual and renegotiated loans.

Statistics

Eighth District Business

	Level	Compounded Annual Rates of Change			
	II/1989	I/1989-II/1989	II/1988-II/1989	1988[1]	1987[1]
Payroll Employment (thousands)					
United States	108,299.0	2.3%	3.0%	3.3%	2.7%
District	6,606.6	−1.6	1.4	2.5	3.5
Arkansas	881.6	0.4	2.9	2.8	2.8
Little Rock	242.5	−0.3	2.8	3.2	2.0
Kentucky	1,387.8	−2.5	1.7	3.2	4.2
Louisville	455.9	−3.3	1.4	3.1	3.9
Missouri	2,262.6	−1.2	1.4	1.8	2.6
St. Louis	1,150.3	−1.7	1.1	1.5	1.9
Tennessee	2,074.6	−2.4	0.5	2.7	4.3
Memphis	440.9	−2.6	1.8	2.7	4.8
Manufacturing Employment (thousands)					
United States	19,654.3	−0.1%	1.5%	2.0%	0.3%
District	1,459.4	−0.8	1.8	2.6	1.7
Arkansas	234.3	−1.4	3.5	4.0	3.7
Kentucky	281.9	1.9	3.4	4.5	3.4
Missouri	433.1	−1.0	1.3	1.3	−0.1
Tennessee	510.1	−1.7	0.5	2.2	1.4
District Nonmanufacturing Employment (thousands)					
Mining	50.7	0.0%	−4.9%	−4.4%	−4.0%
Construction	276.3	−15.9	−3.2	−1.4	3.2
FIRE[2]	337.3	−2.3	0.5	0.5	4.1
Transportation[3]	385.6	−2.0	1.6	3.5	4.5
Services	1,440.8	−0.4	2.7	4.5	5.6
Trades	1,581.1	−2.9	1.4	2.4	4.4
Government	1,076.9	1.0	0.8	1.7	1.9
	I/1989	IV/1988-I/1989	I/1988-I/1989	1988[1]	1987[1]
Real Personal Income[4] (billions)					
United States	$3,525.2	4.1%	4.6%	3.2%	3.2%
District	195.4	8.6	4.8	2.5	3.1
Arkansas	26.6	28.2	9.5	2.5	1.7
Kentucky	41.2	8.2	3.3	2.3	2.9
Missouri	69.1	6.6	4.1	2.1	2.3
Tennessee	58.5	3.5	4.8	3.3	4.8
	Levels				
	II/1989	I/1989	1988	1987	1986
Unemployment Rate					
United States	5.3%	5.2%	5.5%	6.2%	7.0%
District	6.0	6.3	6.5	7.2	7.8
Arkansas	8.3	7.2	7.6	8.1	8.8
Little Rock	7.2	6.0	6.4	7.2	6.9
Kentucky	6.7	7.2	7.8	8.7	9.3
Louisville	5.9	5.6	6.3	6.9	7.1
Missouri	5.2	5.8	5.7	6.3	6.1
St. Louis	5.2	5.9	6.0	6.5	7.0
Tennessee	5.4	5.8	5.8	6.6	8.0
Memphis	5.2	5.0	5.1	5.7	6.8

Note: All data are seasonally adjusted. On this page only, the sum of data from Arkansas, Kentucky, Missouri and Tennessee is used to represent the District.

[1]Figures are simple rates of change comparing year-to-year data.
[2]Finance, Insurance and Real Estate
[3]Transportation, Communications and Public Utilities
[4]Annual rate. Data deflated by CPI-U, 1982-84 = 100.

U. S. Prices

	Level	Compounded Annual Rates of Change			
	II/1989	I/1989-II/1989	II/1988-II/1989	1988[1]	1987[1]
Consumer Price Index (1982-84 = 100)					
Nonfood	123.5	6.4%	4.9%	4.0%	3.6%
Food	124.8	6.7	6.5	4.1	4.1
Prices Received by Farmers (1977 = 100)					
All Products	147.7	−2.7%	10.2%	8.8%	3.1%
Livestock	155.7	−8.0	4.7	2.7	5.6
Crops	139.7	5.0	17.1	18.3	−0.8
Prices Paid by Farmers (1977 = 100)					
Production items	165.0	5.0%	6.5%	6.9%	1.9%
Other items[2]	177.0	4.7	5.4	4.4	1.9

Note: Data not seasonally adjusted except for Consumer Price Index.

[1]Figures are simple rates of change comparing year-to-year data.

[2]Other items include farmers' costs for commodities, services, interest, wages and taxes.

Eighth District Banking

Changes in Financial Position for the year ending March 31, 1989 *(by Asset Size)*

	Less than $100 million	$100 million - $300 million	$300 million - $1 billion	More than $1 billion
SELECTED ASSETS				
Securities	−2.2%	19.7%	10.2%	8.0%
U.S. Treasury & agency securities	1.1	27.6	15.5	10.4
Other securities	−14.7	−27.0	−35.6	−25.9
Loans & Leases	−2.3	19.3	22.3	4.0
Real estate	1.9	23.2	40.6	16.8
Commercial[1]	56.6	8.5	17.6	0.0
Consumer	−2.2	27.3	7.6	−3.6
Agriculture	−2.8	37.4	3.4	−9.0
Loan loss reserve	−3.4	24.2	24.5	11.6
Total Assets	−4.3	18.4	17.0	3.8
SELECTED LIABILITIES				
Deposits	−4.4%	18.8%	17.5%	5.7%
Nontransaction accounts	−3.3	20.1	20.2	8.7
MMDAs	−22.1	−2.8	11.8	8.6
$100,000 CDs	7.6	20.8	21.6	−2.2
Demand deposits	−7.0	10.2	6.4	−0.4
Other transaction accounts[2]	−8.1	20.7	19.4	0.6
Total Liabilities	−4.5	18.3	17.1	4.9
Total Equity Capital	−3.0	18.5	16.3	8.0

Note: All figures are simple rates of change comparing year-to-year data. Data are not seasonally adjusted.

[1]Includes banker's acceptances and nonfinancial commercial paper

[2]Includes NOW, ATS and telephone and preauthorized transfers

Performance Ratios *(by Asset Size)*

	Eighth District			United States		
	I/89	I/88	I/87	I/89	I/88	I/87
EARNINGS AND RETURNS						
Annualized Return on Average Assets						
Less than $100 million	1.14%	1.07%	1.06%	.94%	.74%	.70%
$100 million - $300 million	1.09	1.04	1.13	1.05	.83	.88
$300 million - $1 billion	1.14	1.08	.92	.94	.66	.79
$1 billion - $10 billion	.90	.86	.89	.95	.72	.88
More than $10 billion	—	—	—	.93	.54	.55
Agricultural banks	1.23	1.15	.99	1.15	1.00	.77
Annualized Return on Average Equity						
Less than $100 million	12.48%	11.91%	12.02%	10.51%	8.51%	8.16%
$100 million - $300 million	13.25	12.69	14.14	13.19	10.68	11.56
$300 million - $1 billion	14.59	13.69	12.02	13.14	9.54	11.42
$1 billion - $10 billion	13.52	13.35	13.22	14.58	11.62	13.88
More than $10 billion	—	—	—	17.85	12.21	10.31
Agricultural banks	12.80	11.98	10.76	12.02	10.78	8.50
Net Interest Margin[1]						
Less than $100 million	4.01%	3.92%	4.01%	4.27%	4.24%	4.29%
$100 million - $300 million	4.04	3.91	3.95	4.56	4.19	4.22
$300 million - $1 billion	4.17	3.98	4.09	4.52	4.14	4.27
$1 billion - $10 billion	3.82	3.62	3.78	4.27	4.08	4.04
More than $10 billion	—	—	—	3.52	3.30	3.28
Agricultural banks	3.92	3.84	3.81	4.14	4.03	3.97
ASSET QUALITY[2]						
Nonperforming Loans[3]						
Less than $100 million	1.70%	2.09%	2.68%	2.87%	2.69%	3.25%
$100 million - $300 million	1.73	1.92	2.14	1.88	2.23	2.53
$300 million - $1 billion	1.52	1.61	2.36	2.28	2.46	2.58
$1 billion - $10 billion	1.92	2.46	2.46	1.90	2.39	2.58
More than $10 billion	—	—	—	4.63	5.31	5.90
Agricultural banks	1.95	2.64	3.77	2.50	3.29	4.67
Loan Loss Reserves						
Less than $100 million	1.48%	1.50%	1.49%	1.52%	1.66%	1.65%
$100 million - $300 million	1.40	1.34	1.32	1.46	1.55	1.49
$300 million - $1 billion	1.38	1.36	1.50	1.63	1.71	1.62
$1 billion - $10 billion	1.65	2.15	1.47	1.69	1.91	1.54
More than $10 billion	—	—	—	3.62	4.36	1.97
Agricultural banks	1.85	1.84	1.82	2.12	2.16	2.15
Net Loan Losses[4]						
Less than $100 million	.06%	.08%	.14%	.12%	.16%	.21%
$100 million - $300 million	.10	.08	.13	.12	.14	.16
$300 million - $1 billion	.07	.08	.17	.16	.15	.21
$1 billion - $10 billion	.10	.19	.15	.19	.23	.15
More than $10 billion	—	—	—	.20	.26	.21
Agricultural banks	.04	.08	.20	.09	.15	.27

Note: Agricultural banks are defined as those with 25 percent or more of their total loan portfolio in agriculture loans.

[1]Interest income less interest expense as a percent of average earning assets
[2]Asset quality ratios are calculated as a percent of total loans.
[3]Nonperforming loans include loans past due more than 89 days, nonaccrual, and restructured loans.
[4]Loan losses are adjusted for recoveries.