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Pieces of Eight

An Economic Perspective on the 8th District

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THE EIGHTH FEDERAL RESERVE DISTRICT

CONTENTS

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.

Government-Sponsored Enterprises: Safe and Sound?

by Michelle A. Clark

Thomas A. Pollmann provided research assistance.

In the wake of the costly savings and loan (S&L) bailout, policymakers are assessing the likelihood that the federal government will have to make good on more of its contingent liabilities. As part of a comprehensive effort to assess the federal government's exposure to losses from federally assisted credit and insurance programs, Congress and the Bush Administration are examining ways to bolster the safety and soundness of government-sponsored enterprises (GSEs). Credit extended by GSEs, private corporations chartered by Congress to channel funds to sectors of the economy deemed worthy of special support, has been the fastest-growing component of the almost $6 trillion in federal insurance programs, direct loans and loan guarantees outstanding. This article, the second in a two-part series, describes both the primary concerns policymakers have about GSE operations and some preliminary recommendations to lessen the likelihood of another government, and hence, taxpayer bailout.[1]

The Reform Effort

A number of government agencies and private companies are involved in the effort to quantify the federal government's potential exposure to losses from GSE operations. Because of the special ties GSEs have to the federal government, investors in GSE-guaranteed securities and debt issues assume the government will assist a financially troubled GSE and its debt holders. This well-founded assumption allows GSEs to borrow funds to finance their activities at much lower rates than private-sector corporations with similar risk characteristics. Thus, the market discipline that keeps borrowing costs consistent with expected returns and risks for private-sector corporations is generally absent in GSE operations, and that, most analysts agree, is the crux of the problem.

As instructed under the Financial Institutions Reform, Recovery and Enforcement Act of 1989 (FIRREA), the Treasury Department and the Government Accounting Office (GAO) have issued reports outlining the various risks GSEs face and how these risks can be mitigated.[2] The general reform proposals of both agencies are similar; more specific recommendations are expected from the agencies in 1991. Moody's and Standard & Poor's, two private bond rating agencies, are also involved in the debate about GSE reform, as some proposals would require GSE debt securities to qualify for the agencies' highest ratings absent the government's implicit guarantee (see shaded insert). Congress is expected to tackle the issue of GSE reform after completing a review of the government's deposit insurance schemes in early 1991.

In addition to earning profits for their stockholders, GSEs, unlike purely private firms, are required to satisfy a public policy mandate. These objectives are achieved by taking risks. Like purely private financial firms, GSEs are confronted with four major types of risk: changes in market interest rates (interest rate risk); loan defaults and other credit problems (credit risk); external business conditions, such as natural disasters, industry competition, changes in technology, demographics and legislation (business risk); and poor management decisions (management risk).

The degree to which each GSE is subjected to these risks varies substantially. Fannie Mae, for example, faces much more interest rate risk in its operations than Freddie Mac because a large portion of the mortgages Fannie Mae purchases are retained in its portfolio. Both the GAO and the Treasury Department studies indicated that each GSE has in place internal methods for evaluating the current levels of the various types of risk, although neither agency evaluated the adequacy of these internal controls.[3]

Both agencies concluded that, given the continued close ties between GSEs and the federal government and a history of government assistance to troubled GSEs as well as large banks, companies and municipalities, the federal government would today undoubtedly assist a financially strapped GSE.[4] The GAO also suggests that closure, the only alternative to assisting a GSE, is not a viable option because a GSE failure would threaten its public policy mission and would possibly threaten the solvency of other financial institutions that invest in GSE securities.[5] Given this likely government protection, various proposals are being considered to establish more control over GSE activities. In their initial studies, both the Treasury Department and the GAO suggested two primary areas for reform: minimum (ideally risk-based) capital regulations and increased government supervision of GSE activities.

Rating the GSEs

Of the various reform proposals outlined in the Treasury Department and GAO studies on GSEs, none has garnered more attention than the Treasury Department's proposal to require GSEs to obtain the equivalent of a triple-A rating from at least two major credit rating agencies, ignoring the government's implicit guarantee. The debt securities of the major GSEs are already rated by Moody's and Standard & Poor's (S&P); however, the current ratings are highly dependent on the implicit government guarantee underlying the debt issues. Given this guarantee, most GSE debt already is rated Aaa (Moody's) or AAA (S&P). Analysts believe that under the new ratings proposal, only Sallie Mae and the Federal Home Loan Banks would get the agencies' top ratings. Fannie Mae's and Freddie Mac's debt securities would probably be rated at the lower end of investment grade, while Farm Credit System debt would be rated at the high end of speculative grade debt.

In making its proposal, the Treasury Department asserted that a triple-A rating is appropriate "because it represents the most safe and sound level of credit quality, and thereby the best protection from potential risk." The Treasury Department also believes the ratings requirement would provide a useful measure of the value of the government's implicit subsidy to each GSE. For instance, if a GSE were rated below triple-A absent the government's implicit guarantee, the interest rate portion of the subsidy would be the difference between the rate the GSE actually borrows at and what a private corporation would have to pay with the same rating. Any GSE not meeting the triple-A requirement would be required to submit a business plan to its safety and soundness regulator outlining the actions it plans to take to achieve a triple-A rating rating within five years. This regulator would also be authorized to levy sanctions such as a limit on GSE growth, restrictions on dividend payments and the withdrawal of benefits like the GSE's federal charter or the exemption of GSE securities from SEC registration.

Opponents of this proposal, which include a number of housing industry supporters, claim this ratings requirement will have an adverse effect on the markets GSEs are supposed to support, namely housing, education and agriculture. Mortgage lenders argue that borrowers would ultimately pay higher mortgage rates as the costs of meeting the requirement are passed from Fannie Mae and Freddie Mac to lenders. Some opponents argue that very few banks have triple-A ratings, and that requiring GSEs to meet a higher standard than other financial institutions would put them at a decided competitive disadvantage.

In its GSE study, the GAO did not specifically endorse the Treasury Department ratings proposal, stating only that it was an option worth considering. The House and Senate Banking Committees, which will be responsible for drafting legislation on GSE reform, have sought comment on the proposal from various groups, including the two ratings agencies. While Standard & Poor's has stated it would be able to rate GSE debt ignoring the government guarantee, Moody's has stated it cannot. In a letter to House Banking Committee Chairman Henry Gonzalez, Moody's Director Thomas McGuire said, "a rating formed on the basis of totally hypothetical and unrealistic assumptions would be a somewhat spurious product. . . (these ratings) would not, we believe, have the information content or predictive value of real bond ratings." The debate on this proposal, in addition to other private market mechanisms to evaluate GSE risk, will continue well into 1991.

GSE Capitalization

In analyzing ways to improve the safety and soundness of GSEs, both agencies drew parallels to financial institution regulation because the government is exposed to similar risk characteristics with both types of entities. One of the major elements of bank (and thrift) regulation is minimum capital requirements. An organization's capital usually consists of loan loss reserves and equity capital. Loan loss reserves include funds set aside to cover expected losses, while equity capital—the owners' stake in the enterprise that includes stock, paid-in capital and retained earnings—is held to cover unexpected losses. For private firms without ties to the government, the amount of capital held is influenced by the credit markets; for example, firms with too little capital to cover their risks pay higher interest rates to borrow than well-capitalized firms.

The agencies believe, and most financial analysts concur, that equity capital represents the best measure of protection against loss. One of the major goals of the recently implemented risk-based capital requirements for banks and thrifts was to

increase the amount of equity capital these institutions hold. Regulators have been concerned that the subsidy provided to financial institutions in the form of deposit insurance encourages excessive risk-taking; requiring banks to have more of their own equity at stake lessens the likelihood of insolvency, and hence the likelihood that FDIC funds will be used to pay off depositors.

Commercial bank equity capital ratios are higher, however, than those of the major GSEs. As indicated in table 1, only the Federal Home Loan Banks (FHLBs) had average equity-to-assets ratios above that of commercial banks during the past five years. Both Freddie Mac and Fannie Mae have consistently recorded equity capital ratios significantly below what many analysts would consider prudent levels. Although Fannie Mae, Freddie Mac, the Farm Credit System and the FHLBs all have minimum regulatory capital requirements, the GSEs are given wide latitude in deciding what to include in capital. Senior management within each GSE determines target capital levels based on various "stress tests" run for the current level of credit and/or interest rate risk.

The GAO concluded that Fannie Mae's and Freddie Mac's capital requirements, in particular, offer little protection against risk-taking. The two housing GSEs broadly define capital to include subordinated debt as well as loan loss reserves, so that equity capital is a minor portion of total capital. The GAO argues that GSE subordinated debt should be treated as a liability, not as equity, because it protects the government from losses only if the government responds to a GSE crisis by allowing subordinated debtholders to suffer losses. Moreover, these GSEs' minimum capital requirements do not incorporate the risk of their substantial off-balance sheet activities, their exposure to interest rate risk or the different risks involved in varying types of mortgage investments. Without outlining specifics, both agencies assert that requiring GSEs to boost capital levels—particularly equity capital—would give the GSEs stronger incentives to monitor and control their risk-taking.

Government Supervision

Both the Treasury Department and the GAO recommend a substantial increase in federal monitoring of GSE activities. One of the agencies' primary concerns about GSE operations is the sheer size of the government's implicit guarantee and the tremendous growth in this potential liability during the past 20 years. As indicated in table 2, GSE presence in U.S. credit markets has grown tremendously since 1970. GSE debt issues increased at a 15.2 percent annual rate during the 1970s and at a 9.5 percent annual rate in the 1980s. Since 1987, the largest portion of outstanding GSE securities have been in the form of mortgage-backed securities (MBSs) issued by Fannie Mae and Freddie Mac. In 1985, MBSs represented almost 40 per-

Table 1
Capitalization of the Major GSEs

	Equity capital as a percent of total assets[1]				
	1989	1988	1987	1986	1985
Fannie Mae[2]	0.88%	0.80%	0.76%	0.61%	0.66%
Freddie Mac[2]	0.62	0.61	0.50	0.50	0.67
Sallie Mae	2.90	2.80	3.00	3.60	4.70
FHLBs	7.90	8.90	8.90	9.00	9.00
Farm Credit System[3]	5.90	3.30	8.10	8.00	10.50
U.S. bank average	6.21	6.28	6.00	6.17	6.16

[1] Equity capital and total assets are as of December 31 of each year.

[2] Total assets include mortgage-backed securities not on the balance sheet.

[3] Beginning in 1988, protected stock (stock redeemable at par value by borrower/stockholders) was not considered in calculations of equity capital. The FCS had $3.3 billion in protected capital in 1988 and $1.7 billion in 1989.

SOURCE: "Government-Sponsored Enterprises: The Government's Exposure to Risks," GAO Report to Congress (August 1990); FFIEC *Consolidated Reports of Condition and Income*, 1985-1989.

Table 2
Outstanding GSE Credit Market Borrowing[1]
(End of Calendar Year, Dollar Amounts in Billions)

	1970	1980	1986	1987	1988	1989	Compounded annual rates 1970-80	1980-89
Debt Issues								
Fannie Mae	$15.2	$ 55.2	$ 93.6	$ 97.1	$105.5	$116.1	13.8%	8.6%
Freddie Mac	****	4.6	13.4	17.5	24.8	24.1	****	20.2
Sallie Mae	****	****	12.2	16.5	22.0	28.6	****	****
FHLBs	10.5	37.3	88.8	116.4	136.5	136.1	13.5	15.5
Farm Credit System	13.2	63.0	62.3	55.2	54.6	56.6	16.9	– 1.2
Total issues	38.9	160.1	270.3	302.7	343.4	361.5	15.2	9.5
Mortgage Pools								
Fannie Mae	****	17.1	169.2	212.6	226.4	272.9	****	36.0
Freddie Mac	****	****	97.2	140.0	178.3	228.2	****	****
Total pools	****	17.1	266.4	352.6	404.7	501.1	****	45.6
Total GSE Securities	38.9	177.2	536.7	655.3	748.1	862.6	16.4	19.2

****GSE not generating credit market debt as of this date.

[1]From GSE balance sheets and Federal Reserve Board flow of funds data.

SOURCE: "Report of the Secretary of the Treasury on Government-Sponsored Enterprises." (May 1990).

cent of total GSE securities; by 1989, that portion had increased to almost 60 percent. Led by the spectacular growth in MBS issues, total GSE securities outstanding more than doubled in the latter half of the 1980s, and stood at $863 billion at year-end 1989. GSE growth is not expected to slow any time soon: the Treasury Department projects that borrowing by GSEs will exceed federal government borrowing in fiscal 1991.

In evaluating the federal government's supervision of GSE operations, the agencies agreed adequate oversight was lacking. The GAO pointed out that many GSE regulatory bodies have not been enforcing their existing authorities and that some GSEs are not subject to any federal oversight. The Department of Housing and Urban Development (HUD), the regulatory authority for Fannie Mae (since 1968) and Freddie Mac (since 1989), has the authority to audit and examine the books of the two GSEs, but has never exercised this authority over Fannie Mae and has only asked for periodic reports from Freddie Mac. The only specific enforcement authority HUD has over the housing GSEs is the authority to limit dividend payments, which it has never exercised. In fact, no specific funds have ever been appropriated by HUD for regulatory purposes.[6]

Sallie Mae, on the other hand, has neither a federal regulator nor regulatory capital requirements. The Treasury Department does have audit authority over Sallie Mae, but like HUD, has not exercised this authority. Instead, Sallie Mae sub-

mits a report of its annual audit of financial statements to the Treasury Department, which in turn prepares a report for Congress and the Administration. The GAO concludes that the federal government relies heavily on Sallie Mae's owners and managers to avoid undue risk-taking and set appropriate capital levels.

The most specific recommendation the two agencies made regarding GSE supervision concerns the separation of the GSE financial oversight function from the public policy oversight function. Both agencies cited the thrift crisis as a case where a conflict erupted between the two functions; the Federal Home Loan Bank Board (FHLBB) was both the financial regulator and the promoter of the thrift industry, and it appears as if the latter function took precedence in the Board's operations. The Treasury Department recommends that the current program regulators continue to oversee the GSEs' "fulfillment of purpose," and that other federal entities (new or existing) ensure GSEs are operating in a safe and sound manner. The GAO concurs with the Treasury recommendation, and has suggested several possibilities for financial oversight entities, including placing additional supervisory authority with the Treasury Department, which already has responsibility for approving GSE debt issues.

Conclusion

In establishing GSEs, the federal government sought to influence the flow of credit in private capital markets. Given the tremendous growth in GSEs and the popularity of products such as MBSs, it appears that GSEs are fulfilling their public policy missions. At the same time, however, the failure of one or more GSEs would lead to huge losses, borne ultimately by taxpayers. Based on the initial studies of GSE operations by the Treasury Department and the GAO, it does not appear as if any GSE is in danger of financial collapse. Nonetheless, both agencies suggested that a number of measures should be taken to reduce the potential for large-scale losses as experienced with the S&L crisis.

While they differ somewhat in their assessments of GSE risk and ways to avoid another thrift-like crisis, the two agencies agree on three central principles that should guide policymakers tackling GSE reform. First, GSEs should meet credit and operations standards that are not based solely on their federal ties. Second, GSEs should have a significant amount of their own capital at risk so that the institutions absorb losses first; having more owner equity at stake will increase the incentives for GSEs to monitor and control their risks. Third, GSEs should receive effective federal supervision, which implies enforcement of existing regulatory authorities in addition to some changes in the structure of the regulatory functions. The safety and soundness of GSEs will be more likely if reform is properly undertaken.

FOOTNOTES

[1]See Michelle A. Clark, "Government-Sponsored Enterprises: A Profile," *Pieces of Eight* (September 1990), pp. 1-5, for a discussion of the various ways the major GSEs channel credit into the housing, agricultural and educational markets.

[2]See United States Department of Treasury, *Report of the Secretary of the Treasury on Government Sponsored Enterprises* (May 1990) and United States General Accounting Office Report to Congress, *Government-Sponsored Enterprises: The Government's Exposure to Risks* (August 1990).

[3]The GSEs' responses to the GAO's initial evaluation were printed in an appendix to the GAO report. Most GSEs defended their internal risk evaluation procedures.

[4]The GAO study cites assistance given to Fannie Mae and the Farm Credit System at various times during the 1980s, in addition to the government assistance provided to Continental Illinois, Chrysler, Lockheed, Conrail and the City of New York, to support this assertion.

[5]Federally insured national and state Fed member banks as well as thrifts are allowed to hold unlimited amounts of GSE debt and securities in their portfolios; a GSE failure might imperil the depost insurance fund in addition to causing losses for private investors.

[6]Since the agencies released their reports, HUD has assembled a team of executives to oversee its GSE financial regulatory responsibilities. HUD has also announced plans to conduct banklike examinations of Fannie Mae and Freddie Mac.

The Mississippi River System and Barge Industry

by Jeffrey D. Karrenbrock

David H. Kelly provided research assistance.

The vast Midwestern river network played a key role in the settlement and subsequent development of many U.S. cities.[1] Because of mountainous terrain and poorly developed trails, water was often the only practical means of transporting people and goods until as late as the mid-1800s. Since that time, however, river transportation has been forced to share its once-dominant role with rail, highway and air transportation. Despite its decline in relative importance, water transportation still accounts for a significant portion of U.S. freight traffic, about 15 percent in 1988.

Much of the river system, ports and barge lines that serve today's waterborne commerce is located in Eighth Federal Reserve District states. This article describes the Mississippi River system and the barge industry, and concludes with a brief outlook for the inland waterways system.

The Inland Waterways

The United States has more than 25,500 miles of navigable rivers, harbors and intracoastal waterways. The Mississippi River basin, which more than encompasses the Eighth Federal Reserve District, has about 8,900 miles of navigable water.[2] As the map at right shows, the major rivers included in the basin are the Mississippi, Missouri, Illinois, Ohio, Cumberland, Tennessee and Arkansas. Table 1 indicates that the Mississippi River has the largest amount of navigable water in the basin, stretching more than 1,800 miles from Minneapolis, Minnesota, to the Gulf of Mexico. The Ohio River contains the second-largest amount of navigable water, followed by the Missouri.

Many U.S. waterways would not be navigable without the continuing efforts of the U.S. Army Corps of Engineers. In 1824, the Corps was assigned the responsibility for improving rivers and harbors in this country. Today, the Corps builds, maintains and operates federal river and harbor projects. The Corps attempts to maintain at least 9 feet of water in designated inland waterway rivers so they can be navigated safely by tows and barges. The Corps accomplishes this task by dredging and using dikes and a system of locks and dams. Most of the tributaries of the Mississippi River, and the Mississippi River itself north of St. Louis, contain a series of locks and dams to maintain 9 feet of water in the channels.

Commodity Movement

Most of the goods moved on the inland waterways are bulky commodities, such as petroleum products, coal, gravel and grain. In addition, goods that are too large or too heavy to be moved by rail or highway move on barges. At times, heavy military equipment is moved via the rivers. These heavy goods move by barge primarily because this mode of transit offers a relative advantage in fuel efficiency. A small barge can move 1,500 tons or more than 450,000 gallons of a commodity, which is about 15 times greater than one rail car and 60 times greater than one semi-truck. In terms of fuel efficiency, one gallon of fuel can move one ton of a commodity by water 2.5 times farther than by rail and almost 9 times farther than by highway. However, movement of goods by barge is often slower than other means of transportation. Nonetheless, for commodities that are largely stockpiled, such as coal, petroleum products and fertilizers, the timing of shipments is not always crucial.

The amount of freight traffic moved on the major segments of the Mississippi River system is shown in table 1. The Mississippi River carries the largest amount of commodities, with farm products, coal, and petroleum and coal products accounting for most of its freight. The Ohio, Cumberland and Tennessee Rivers derive much of their freight from the vast coal fields on their banks.

Although the Missouri River is the third-longest in the system, it carries the least amount of freight of all system rivers. The Missouri's importance, however, stems from the fact that it provides a large portion of the total water flow of the Mississippi River. For example, in 1988, 60 to 80 percent of the total water flow of the Mississippi River at St. Louis came from the Missouri River.

The Barge and Towing Industry

The amount of cargo handled by the barge and towing industry is dependent on both domestic and international economic activity. Between 1960 and 1979, freight traffic on the Mississippi River system grew steadily at an average annual rate of 3.6 per-

Figure 1
Mississippi River System

cent. This strong growth on the Mississippi River system and other waterways was expected to continue throughout the 1980s and 1990s. For example, some forecasts were calling for tonnage towed on U.S. waterways to double or triple by the year 2000. The expected increase in demand for barge services, in conjunction with favorable tax shelter laws, resulted in a rapid expansion of barge and tow production. The number of dry cargo barges in the United States' fleet grew 25.4 percent between 1975 and 1980, while the number of tank barges grew 18.2 percent. The towboat-tugboat fleet grew 14.5 percent during this period.

The anticipated boom in demand never materialized, however, as agricultural and coal exports fell and the U.S. economy entered a recession in the early 1980s. For various reasons, including the grain embargo of the Soviet Union and slow economic growth abroad, U.S. agricultural and coal exports fell 20 percent and 30 percent, respectively, between 1981 and 1983. This was particularly hard on Mississippi River system barge firms because more than 60 percent of all U.S. export grain goes through New Orleans and 80 percent of all U.S. export steam coal moves through the Lower Mississippi Valley.

Table 1
Selected Mississippi River System Statistics

	Navigable length[1] (miles)	1988 freight traffic (million tons)	Percent of 1988 Freight Traffic Accounted for by				
			Farm products	Coal	Non-metallic minerals	Chemicals & allied products	Petroleum and coal products
Arkansas Waterway	445	6.7	24%	1%	26%	24%	8%
Cumberland River	381	14.0	1	44	32	3	5
Illinois Waterway	327	37.8	36	16	6	11	14
Mississippi River	1,811	441.6	27	14	5	10	16
Missouri River[2]	735	6.7	10	0	67	9	5
Ohio River	981	192.6	4	57	13	6	9
Tennessee River	652	47.1	7	50	15	7	7
Mississippi River System	6,934	601.6	14	35	11	8	14

[1]Channel depth of at least 9 feet.

[2]Channel depth less than 9 feet.

SOURCES: Lengths and information on freight traffic are the author's estimates based on information provided in the *Coastguard Light List,* Vol. 5, Mississippi River System, 1986, and the *U.S. Army Corps of Engineers' Waterborne Commerce of the United States*, 1988.

In addition to facing contracting demand from international markets, the barge industry also had to deal with a domestic economy that was entering a recession. Partially as a result of the economic slowdown, domestic demand for petroleum products and the associated transportation services slowed. The demand for internal shipments of other heavy commodities slowed as well. As a result, freight traffic on the Mississippi River system fell in 1982 and 1983 and grew at an average annual rate of 0.46 percent between 1980 and 1988, much slower than the 3.6 percent rate of the 1960 to 1979 period.

The consequence of the rapid construction period followed by declining freight traffic volume was an overbuilt industry. Once the industry realized that the expected demand boom was not materializing, barge building nearly ceased. For example, hopper barge construction reached nearly 2,500 units in 1981, but sank to fewer than 250 units in 1984. Tank barge construction peaked at 146 in 1981, but plunged to fewer than five per year from 1984 to 1988.[3]

Even though the U.S. economy and exports resumed their growth in the late 1980s, helping to revive the industry, the drought of 1988 was a setback to the industry. Low water levels slowed delivery times, tows were required to carry fewer barges than usual, and temporary groundings tied up shipping channels. Some firms were hurt financially because they had contracted earlier in the year to carry freight at fixed rates and the extra costs associated with greater travel time between ports could not be passed along.

The stressful period of the 1980s stimulated considerable consolidation in the industry. The American Waterways Operators estimate that the number of inland waterway operators fell from 1,800 in 1980 to about 800 in 1989. In 1989, these barge and towing firms employed more than 175,000 workers and operated more than 5,000 tugboats and towboats and more than 30,000 barges on the U.S. inland waterways system.

Turning the Bend

Several factors suggest that the 1990s will be a less-stressful period than the mid-1980s for the barge industry. First, cargo carried on the inland waterways system is expected to slowly increase through 2000. The expected average annual growth of tonnage to be carried on different segments of the system between 1986 and 2000 is shown in table 2. Traffic projections for the Mississippi River are broken into three segments. The most rapid traffic growth on the Mississippi is expected to occur in the upper segment, with the lower segments expected to grow slightly slower. Nonetheless, the Arkansas River has the highest potential traffic growth at 4.5 percent per annum. On the other hand, freight traffic on the Missouri could decline at an annual rate of 0.9 percent. All other rivers' expected traffic growth is bracketed by these values, indicating slow but steady growth throughout the Mississippi River system. Commodities expected to grow the fastest, in terms of

Table 2
U.S. Internal Waterway Traffic Projections
(average annual growth rate: 1986 to 2000)

Selected waterway segments	Low	High
Upper Mississippi[1]	1.7%	3.1%
Middle Mississippi[2]	1.5	2.9
Missouri River	−0.9	2.1
Lower Mississippi[3]	1.4	2.9
Arkansas River	1.0	4.5
Illinois Waterway	1.2	2.5
Ohio River System	1.3	2.8
Ohio River—Mainstem	1.3	2.8
Cumberland River	1.2	3.5
Tennessee River	1.2	2.6

SOURCE: Derived from the U.S. Army Corps of Engineers, *The 1988 Inland Waterway Review,* November 1988, Table 2.4, p. 50.

[1] From Minneapolis to the mouth of the Missouri River.

[2] Includes the Mississippi River from the mouth of the Missouri to the mouth of the Ohio, the Missouri River from Sioux City, Iowa, to its mouth, and the Kaskaskia River from Fayetteville, Illinois, to its mouth. Traffic from all three rivers is included in the Middle Mississippi forecast.

[3] Extends from the mouth of the Ohio to Baton Rouge. The segment also includes the Arkansas River and other waterways. All of these segments are included in the Lower Mississippi projections.

volumes shipped, are industrial and agricultural chemicals, farm products and coal.

In addition to expected increases in freight traffic, a second factor that will help the long-term outlook of the barge industry is the ongoing improvement of the system's locks and dams. The Inland Waterways Trust Fund (IWTF) was authorized by the Inland Waterways Revenue Act of 1978 and amended by the Water Resources Development Act of 1986. These laws established a trust fund funded by fuel taxes on tows operating on 27 waterways. The fuel tax was originally set at 4 cents per gallon, but is currently at 11 cents per gallon and will reach 20 cents per gallon in 1995. The laws state that monies from the trust fund will be available for construction and rehabilitation expenditures for navigation on the inland and coastal waterways.

The fuel tax revenues collected in the trust fund are allocated to projects on a 50/50 cost-sharing basis with the federal government. Currently, nine projects are being funded by the IWTF to improve or replace locks and dams on the inland waterway system. These improvements will reduce traffic delays and lower the cost of waterway transportation.

Thus far, new construction funded by trust fund money has been relatively small, but outlays are expected to increase significantly through the end of the century. Tax revenue collection did not start until 1981 and the first trust fund appropriations occurred in 1985. Thus far, $71.8 million from the Inland Waterways Trust Fund has been used in construction. Between 1980 and 1988, construction spending on inland waterways navigation projects fell from $432 million in 1982 to $218 million in 1987, before jumping to $317 million in 1988. Total federal and IWTF expenditures of $262.8 million are expected for the nine scheduled projects in fiscal year 1990. Total construction expenditures on these projects are expected to remain at or slightly above $200 million per year through fiscal year 1998, when expenditures will start to trail off. Several new projects that would require additional funding, however, are under consideration.

While the trust fund can currently provide for partial funding of the nine scheduled projects, its resources are limited. With federal budget reductions likely, the amount of money available for matching trust fund money may fall. At the same time, more areas will need repair as many of the locks and dams on the system are more than 50 years old and are inadequate for handling today's freight volumes. This implies that the Corps and industry will have to make some tough choices and, hopefully, will allocate scarce funds to the projects providing the highest expected return. An alternative is to initiate user fees or increase fuel taxes to make up for potential federal government expenditure cut-backs.

Conclusion

Although often overlooked by those not directly involved in the industry, the inland waterways system serves as a vital method of shipping bulky commodities at a relatively low cost. Almost half of the freight traffic on the Mississippi River system is accounted for by energy-related products. As the domestic economy expands and industries become more internationally oriented in the 1990s, the inland waterways system will play an important role in serving these markets. Like any type of infrastructure, the system needs constant repair and maintenance to remain cost effective. Current work on the system will help maintain efficiency, but more work will be needed for the industry to maintain its role in freight transportation.

FOOTNOTES

[1] See this Bank's 1989 *Annual Report.*

[2] This figure includes the lengths of all navigable channels, including those with depths of less than 9 feet. The figures in table 1 are for channels with at least 9 feet of water, except for the Missouri River.

[3] Figures on barge construction were derived from Jack Lambert and Leeper, Cambridge & Campbell, Inc.'s *Barge Fleet Profile of Inland River Equipment,* March 1990. St. Paul, MN.

Business

District Services: What They Are and Why They Have Grown

by Thomas B. Mandelbaum

Thomas A. Pollmann provided research assistance.

The economy of the Eighth Federal Reserve District, mirroring the nation, has experienced more rapid employment growth in the services sector than in other sectors, such as manufacturing.[1] This shift to services has generated considerable controversy in recent years.[2] Some analysts, for example, suggest that the United States is losing its industrial base, becoming a nation of fast-food restaurants and laundries. Prior to examining reasons for the expansion of services, the specific service sectors that are important in the Eighth District are identified.

What Are Services?

Some of the controversy about services stems from confusion about definitions. The service sector often is used to refer to all industrial sectors other than those producing goods—in other words —all sectors but agriculture, mining, construction and manufacturing. In most government publications, these sectors are referred to as "service-producing" sectors and include retail and wholesale trade; finance, insurance, and real estate; government; transportation, communication and public utilities; and a group simply called "services." To avoid confusion, "services" will be referred to as "other services" in this article.

Table 1 shows that the share of U.S. output accounted for by service-producing sectors rose from 60 percent in 1963 to 67.4 percent in 1986, while other services' share rose from 11.7 percent to 15.3 percent. Although other services accounted for less than one-fifth of all service-producing sector output in 1963, its rapid growth caused it to account for almost half of the 1963-86 rise in the service-producing sector's share. In the Eighth District, the shift toward services was not quite as dramatic as at the national level. The output share of service-producing sectors rose between 1963 and 1986 from 59.5 percent to 63.4 percent while the other services sector's share rose from 10.8 percent to 13.3 percent.

Table 1
Percent of Total Output, 1963 and 1986

	Service-producing sectors		Goods-producing sectors	
	Total	Other services	Total	Mfg.
U. S.				
1963	60.0%	11.7%	40.0%	21.3%
1986	67.4	15.3	32.6	22.1
Eighth Dist.				
1963	59.5	10.8	40.5	21.7
1986	63.4	13.3	36.6	26.2
Arkansas				
1963	55.8	10.2	44.2	15.7
1986	59.2	11.1	40.8	26.5
Kentucky				
1963	51.6	8.7	48.4	25.6
1986	57.9	10.9	42.1	25.7
Missouri				
1963	63.1	11.7	36.9	21.0
1986	67.6	15.0	32.4	24.7
Tennessee				
1963	63.4	12.0	36.6	21.6
1986	64.7	14.1	35.3	28.2

SOURCE: U.S. Department of Commerce (1988)

Table 2 shows that in both the United States and the Eighth District, health services and business services were the two largest industries in the other services sector and were responsible for most of the sector's growth. Health services accounted for 4.8 percent of the District's 1986 total output, up from 2.6 percent in 1963. Almost half of health services employees work in hospitals. Business services, comprising 2.6 percent of District output in 1986, played a smaller role in the economy of each District state than in the U.S. economy. The largest business services industries in the country, in descending order of employment, are personnel supply services, services to buildings (mostly cleaning and maintenance), computer and data processing services, management and public relations, detective and protective services, equipment rental and advertising.

As output has risen in service sectors, so has employment. Employment in services generally refers only to workers in industrial sectors that produce services rather than to workers in occupations providing services. A janitor working for a manufacturer, for instance, is not classified as a service worker, but as a manufacturing employee.

Table 2
Other Services Industries as a Percent of Total Output, 1963 and 1986

Industry	United States		District	
	1963	1986	1963	1986
Other services	11.7%	15.3%	10.8%	13.3%
Health services	2.7	4.5	2.6	4.8
Business services	1.6	3.5	1.1	2.6
Miscellaneous services[1]	0.9	1.5	0.7	0.9
Legal services	1.0	1.0	0.9	0.7
Social services	0.9	0.9	1.1	0.7
Auto repair, garages	0.5	0.8	0.6	0.9
Personal services	1.1	0.7	1.1	0.8
Hotels and lodging	0.7	0.6	0.6	0.5
Educational services	0.6	0.6	0.5	0.5
Amusement and recreation	0.5	0.5	0.4	0.4
Miscellaneous repair	0.3	0.3	0.3	0.2
Private households	0.8	0.2	0.9	0.2
Motion pictures	0.2	0.2	0.1	0.1

SOURCE: U.S. Department of Commerce (1988)

[1]Includes engineering and architectural services; noncommercial research organizations; accounting, auditing and bookkeeping; and museums and botanical and zoological gardens.

In the nation, the District and each state, other services' job growth in the last decade has been the most rapid of any major sector. As shown in table 3, other services employment in the District grew at a 4.4 percent annual rate between 1979 and 1989. In comparison, the broader service-producing sector employment rose at a 2.4 percent rate, while total nonfarm employment rose at a 1.6 percent rate. Although other services accounted for less than one-fifth of total nonfarm employment in 1979, it generated more than half of the new nonfarm jobs during the decade in both the District and the nation.

The Shift to Services: A Sign of Deindustrialization?

The share of the nation's and the District's employment accounted for by manufacturing has declined at the same time that the share of the service-producing sectors, and particularly the other services sector, has risen (see figure 1). While these relative shifts have actually taken place throughout the postwar period, they have attracted considerable attention since 1979, after which not only manufacturing's share of employment, but also the absolute number of manufacturing workers, declined. This has led some observers to suggest that other services' rising share is a symptom of the eroding U.S. industrial base, or as some have described it, the "deindustrialization" of America.

In terms of output rather than employment, however, manufacturing's share has not declined in the postwar period, fluctuating around a 21 percent average. In 1987, U.S. manufacturing's share of real output was 21.8 percent. Table 1 reveals that, in the Eighth District, manufacturing's share of real output has actually expanded, rising from 21.7 percent in 1963 to 26.2 percent in 1986.[3] Manufacturing's share of real output rose in Arkansas, Missouri and Tennessee, while there was little change in Kentucky.

The contrasting trends of employment and output shares in manufacturing are indicative of the relatively rapid productivity growth in that sector, which has allowed a smaller share of workers to produce a constant share of the national output. Productivity growth in manufacturing, as well as in agriculture, and to a lesser extent service-producing sectors, has contributed to the rising affluence enjoyed by U.S. consumers. As their incomes have risen, consumers have chosen to spend a higher proportion of their budgets on services.

Rather than a sign of deindustrialization, the rising share of economic activity devoted to services reflects the rising affluence of U.S. consumers, made possible, in part, by the success of manufacturers in increasing labor productivity. Without enhancing labor productivity, manufacturing could not have maintained its constant share of U.S. output and enjoyed the rapid expansion in exports during the last few years. Productivity gains in manufacturing and throughout the economy allowed American consumers to enjoy a rising affluence which enabled them to purchase an increasing quantity of services.

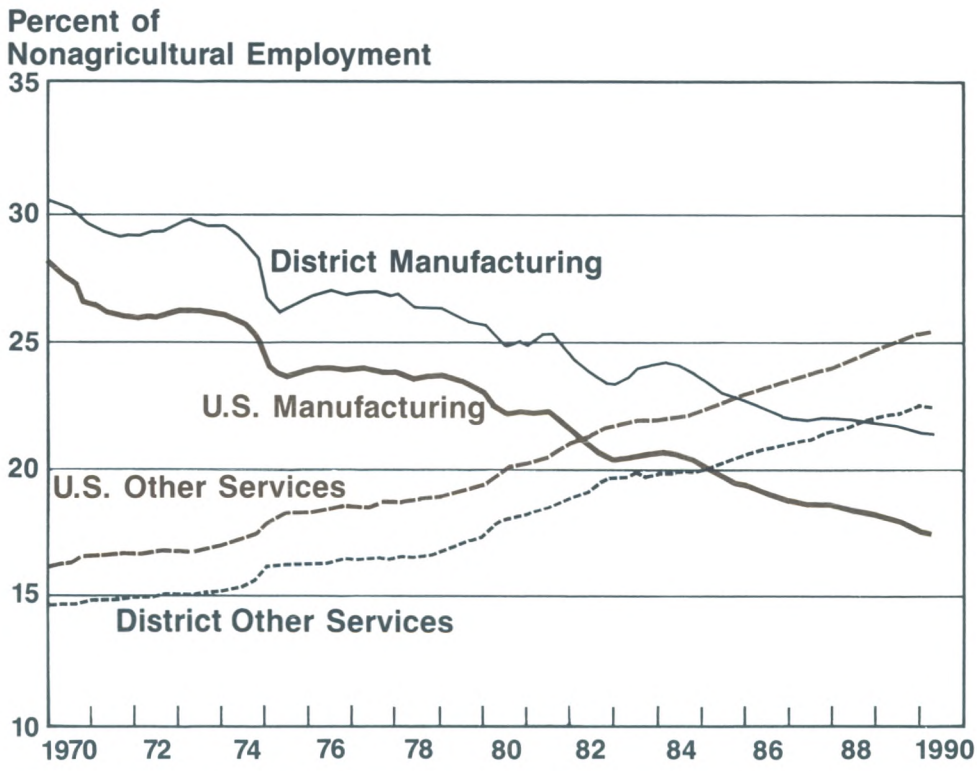
Economic Development and Purchases of Other Services

Some research indicates that as nations develop, they move through stages characterized by changing spending and production patterns. When incomes are low, consumers devote most of their budgets to necessities, such as food, but as incomes rise, a larger proportion is spent on manufactured goods. Finally, in the mature stages of development, consumption shifts more to services-

Table 3
Compounded Annual Rate of Change of Employment, 1979-89

	U.S.	District	Arkansas	Kentucky	Missouri	Tennessee
Nonagricultural employment	1.9%	1.6%	1.7%	1.4%	1.4%	1.9%
Service-producing	2.7	2.4	2.6	2.4	2.0	2.8
Other services	4.7	4.4	4.8	4.3	3.7	5.0
Goods-producing	−0.4	−0.3	0.1	−0.9	−0.4	0.1
Manufacturing	−0.8	−0.2	0.5	−0.5	−0.6	0.0

Figure 1
Manufacturing and Other Services' Employment Shares



producing sectors.[4] To the extent one can make inferences regarding changes over time from cross-sectional comparisons, evidence suggests such a pattern of development also can be found for other services among U.S. states: states with higher per capita incomes tend to have higher proportions of their workforce producing other services.[5] Since other services tend to be consumed where they are produced, this relationship between per capita income and employment in other services reflects the purchasing patterns of the state's consumers.

Such a correspondence exists between per capita income and other services' employment share in District states. Each state's rank in per capita income among all states is close to its rank in other services' employment share. In 1986, for example, Arkansas and Kentucky ranked 48 and 43 in per capita income and ranked 47 and 43 in the size of their other services employment share. Tennessee ranked 39 in per capita income and 38 in other services' employment share. Missouri's per capita income was substantially higher, ranking 24, while its employment share accounted for by other services ranked 17.

Why the Rapid Growth in Producer Services?

It is easy to see how rising affluence would increase the demand for some industries within other services, like personal services and health services, which are mostly purchased directly by consumers. (The expansion of health services was also fueled by the growing number of elderly consumers and the myriad of technological advances

king new treatments available.) One of the the fastest growing segments, however, has been "producer" services, which are primarily sold to other businesses rather than to consumers. This group is usually defined to include business services, legal services and miscellaneous professional services.

Employment in U.S. producer services rose at a rapid 6.2 percent rate between 1959 and 1982 and accelerated to a 7.5 percent rate of increase between 1982 and 1989. In comparison, the growth rate of total nonagricultural employment was below 3 percent in both periods. As table 1 shows, output growth of business services, which accounts for most of producer services, has been rapid in the District as well; this sector's output share more than doubled to 2.6 percent between 1963 and 1986.

One frequently mentioned cause for the growth of producer services is "unbundling." This refers to the practice of companies increasingly contracting for services rather than generating them internally. For example, a manufacturer may have previously used its own employees for legal, accounting and data processing services, but finds it more cost-effective to dismiss service employees and purchase these services from firms in the producer service industry. If such unbundling were widespread, the rapid rise in producer services employment might reflect nothing more than the shifting of workers in service occupations from non-service industries like manufacturing to services sectors with no net increase in service activity in the economy.

Research indicates, however, that unbundling accounts for only a negligible proportion of the growth in producer services. For example, one study found that unbundling has been only a "very small factor" in the 1972-85 employment growth of producer services.[6] Of the 6 percent annual rate of increase in producer services during the 1972-85 period, 2.6 percentage points were found to be due to the overall expansion of the U.S. economy, while 3.3 percentage points of the growth were due to changing business practices. Specifically, businesses have chosen to use services to a greater extent in their production processes. Rather than replacing internally generated services with purchased services as implied by the unbundling notion, businesses are purchasing additional services.

To a small extent, rising affluence and the associated shift to luxury goods, which require more producer services such as advertising, may be responsible for the rapid growth of producer services. More likely, the increased demand stems from technological changes that have allowed firms to specialize in particular services and, by spreading costs among many customers, provide their services at a low cost. Data processing firms, for instance, allow the cost of computer-related technology to be divided among many users. This is especially helpful for small businesses that have provided much of the economy's growth in the last decade. Telecommunications innovations have permitted the delivery of some services, like data processing, to increasingly distant markets.

Summary

The nation and Eighth District have increasingly used more of their resources to produce services because, as consumers have become wealthier, they have chosen to purchase proportionately more services. This rising affluence, in part, stems from relatively rapid productivity gains in the manufacturing sector that have allowed it to produce a stable share of the nation's output with a declining share of the nation's workers. Rather than a sign of a deteriorating industrial base, these developments appear to be a response to the evolving demands of consumers.

To a surprising extent, the rapid job growth in service-producing sectors reflects growth in the single sector referred to as other services. Much of the growth of this sector is accounted for by the growth in health services and business services. To varying degrees, rising consumer affluence and technological innovations have contributed to the growth of these sectors.

FOOTNOTES

[1]See Thomas B. Mandelbaum, "In Search of a Regional Economic Identity," *Pieces of Eight - An Economic Perspective on the Eighth District* (September 1989). Due to data limitations, data for Arkansas, Kentucky, Missouri and Tennessee are used to represent the Eighth District, which actually includes Arkansas and portions of six other states, as depicted on the inside front cover of this publication.

[2]Concerns about the relatively low level and unequal distribution of earnings in Eighth District service sectors will be discussed in a forthcoming article in this publication. Earnings in U.S. services are discussed in Lynn Browne, "Taking in Each Other's Laundry — The Service Economy," *New England Economic Review*, Federal Reserve Bank of Boston (July/August 1986), pp. 20-31.

[3]The increase of both the District manufacturing and service-producing shares was possible because of a substantial contraction in nonmanufacturing goods-producing sectors: agriculture, forestry, fisheries, mining and construction.

[4]For 47 countries, for example, the correlation coefficient between 1982 per capita GNP and the 1980 proportion of workers in service-producing industries was 0.62. See Browne (July/August 1986) op. cit., p. 31. The relationship between economic development and changing patterns of industrial composition is discussed by Colin Clark in *Conditions of Economic Progress* (1940).

[5]Browne (1986) op. cit., p. 26.

[6]See John Tschetter, "Producer Services Industries: Why Are They Growing So Rapidly?," *Monthly Labor Review*, (December 1987), pp. 31-40. Bobbie H. McCrackin, "Why Are Business and Professional Services Growing So Rapidly?" Federal Reserve Bank of Atlanta, *Economic Review* (August 1985), pp.14-28 also finds unbundling is not a major reason for the growth of producer services.

Statistics

Eighth District Business

	Level	Compounded Annual Rates of Change			
	III/1990	II/1990-III/1990	III/1989-III/1990	1989[1]	1988[1]
Payroll Employment (thousands)					
United States	110,638.0	0.4%	1.8%	2.7%	3.3%
District	6,894.7	0.9	1.1	2.9	3.5
Arkansas	918.0	1.2	2.7	3.0	3.5
Little Rock	248.4	−0.7	1.2	3.0	3.5
Kentucky	1,477.5	4.4	2.3	3.8	4.0
Louisville	485.0	4.6	3.2	4.1	3.1
Missouri	2,323.7	−0.6	0.4	2.2	2.8
St. Louis	1,183.0	−0.5	0.6	2.3	2.3
Tennessee	2,175.5	0.2	0.5	3.0	4.0
Memphis	466.2	1.0	1.6	1.5	7.3
Manufacturing Employment (thousands)					
United States	19,077.0	−1.9%	−1.7%	0.4%	1.7%
District	1,470.0	−1.0	−0.7	1.9	3.2
Arkansas	232.6	2.7	1.1	1.6	3.1
Kentucky	285.3	0.1	0.4	3.6	4.5
Missouri	432.5	−4.0	−1.5	1.2	2.3
Tennessee	519.5	−0.6	−1.3	1.9	3.4
District Nonmanufacturing Employment (thousands)					
Mining	49.2	−4.0%	−1.2%	−4.8%	−5.3%
Construction	295.0	−0.1	0.0	1.0	0.3
FIRE[2]	337.7	−0.4	0.1	0.3	0.5
Transportation[3]	397.5	−0.7	−0.5	3.5	4.3
Services	1,555.3	2.3	3.1	5.1	6.3
Trades	1,648.3	0.8	0.9	3.0	3.7
Government	1,139.4	3.3	2.5	2.2	2.4
	II/1990	I/1990-II/1990	II/1989-II/1990	1989[1]	1988[1]
Real Personal Income[4] (billions)					
United States	$3,556.5	1.5%	1.2%	2.7%	3.9%
District	194.2	−0.2	1.1	1.9	2.8
Arkansas	25.5	−3.1	2.0	1.6	2.5
Kentucky	42.0	0.0	2.2	2.5	2.8
Missouri	67.9	0.6	0.4	1.8	1.7
Tennessee	58.8	0.0	0.7	1.7	4.4
		Levels			
	III/1990	II/1990	1989	1988	1987
Unemployment Rate					
United States	5.6%	5.3%	5.3%	5.5%	6.2%
District	5.8	5.3	5.8	6.5	7.2
Arkansas	7.0	6.8	7.2	7.7	8.1
Little Rock	6.0	5.9	6.3	6.4	7.1
Kentucky	5.5	5.7	6.2	7.9	8.8
Louisville	5.0	4.9	5.6	6.3	6.9
Missouri	6.1	4.8	5.5	5.7	6.3
St. Louis	6.4	5.1	5.5	5.9	6.5
Tennessee	5.1	5.0	5.1	5.8	6.6
Memphis	4.6	4.6	4.7	5.2	5.7

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			
	III/1990	II/1990-III/1990	III/1989-III/1990	1989[1]	1988[1]
Consumer Price Index (1982-84=100)					
Nonfood	131.1	7.0%	5.5%	4.7%	4.0%
Food	133.1	5.0	5.7	5.8	4.1
Prices Received by Farmers (1977=100)					
All Products	150.3	-4.4%	3.7%	6.8%	9.0%
Livestock	173.3	3.1	8.8	6.8	2.6
Crops	126.3	-14.4	-3.1	6.9	18.6
Prices Paid by Farmers (1977=100)					
Production items	170.0	2.4%	1.2%	6.2%	6.9%
Other items[2]	184.0	2.2	3.4	4.4	4.4

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 June 30, 1990 *(by Asset Size)*

	Less than $100 million	$100 million - $300 million	$300 million - $1 billion	More than $1 billion
SELECTED ASSETS				
Securities	-1.3%	15.2%	7.8%	17.0%
U.S. Treasury & agency securities	5.2	20.1	13.4	28.3
Other securities[1]	-10.4	3.1	-5.1	-7.0
Loans & Leases	0.5	8.9	5.5	5.3
Real estate	3.0	13.2	14.0	17.2
Commercial[2]	-6.9	0.4	-6.1	0.1
Consumer	-0.7	6.4	10.3	4.6
Agriculture	6.1	13.2	21.4	-12.0
Loan loss reserve	-0.4	11.1	-1.5	19.2
Total Assets	0.5	11.3	5.0	3.9
SELECTED LIABILITIES				
Deposits	0.6%	12.5%	5.9%	6.0%
Nontransaction accounts	1.5	14.4	8.0	8.8
MMDAs	-7.3	6.4	2.2	29.8
$100,000 CDs	5.3	8.2	-6.0	9.5
Demand deposits	-6.0	2.4	-6.0	-1.9
Other transaction accounts[3]	1.7	12.0	10.9	4.3
Total Liabilities	0.5	11.4	5.0	3.6
Total Equity Capital	0.2	10.6	5.0	26.3

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

[1]Includes state, foreign and other domestic, and equity securities

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

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

Performance Ratios *(by Asset Size)*

	Eighth District			United States		
	II/90	II/89	II/88	II/90	II/89	II/88
EARNINGS AND RETURNS						
Annualized Return on Average Assets						
Less than $100 million	1.07%	1.13%	1.06%	.82%	.88%	.71%
$100 million - $300 million	1.06	1.08	1.04	.95	.98	.85
$300 million - $1 billion	1.03	1.03	1.04	.81	.91	.65
$1 billion - $10 billion	.80	.74	.84	.66	.85	.69
More than $10 billion	—	—	—	.60	.93	.64
Agricultural banks	1.22	1.23	1.14	1.04	1.14	1.00
Annualized Return on Average Equity						
Less than $100 million	11.51%	12.22%	11.66%	8.94%	9.64%	8.03%
$100 million - $300 million	12.80	13.08	12.66	11.73	12.28	10.89
$300 million - $1 billion	12.93	13.01	13.13	10.68	12.56	9.44
$1 billion - $10 billion	12.13	11.21	12.74	10.04	13.00	10.87
More than $10 billion	—	—	—	12.06	17.83	14.03
Agricultural banks	12.38	12.45	11.85	10.76	11.71	10.56
Net Interest Margin[1]						
Less than $100 million	3.98%	4.04%	3.92%	4.10%	4.39%	4.22%
$100 million - $300 million	3.90	4.06	3.92	4.34	4.54	4.20
$300 million - $1 billion	4.03	4.13	3.98	4.32	4.47	4.13
$1 billion - $10 billion	3.70	3.65	3.67	4.19	4.20	4.03
More than $10 billion	—	—	—	3.24	3.42	3.34
Agricultural banks	3.89	3.96	3.83	4.01	4.17	4.03
ASSET QUALITY[2]						
Nonperforming Loans[3]						
Less than $100 million	1.63%	1.66%	1.99%	1.95%	2.18%	2.49%
$100 million - $300 million	1.75	1.76	1.78	1.98	1.95	2.07
$300 million - $1 billion	1.39	1.49	1.48	2.31	2.55	2.28
$1 billion - $10 billion	1.84	2.18	2.29	2.68	2.06	2.23
More than $10 billion	—	—	—	4.58	4.78	5.12
Agricultural banks	1.79	1.87	2.26	2.03	2.29	2.84
Loan Loss Reserves						
Less than $100 million	1.44%	1.45%	1.49%	1.51%	1.58%	1.63%
$100 million - $300 million	1.49	1.47	1.33	1.48	1.48	1.50
$300 million - $1 billion	1.36	1.48	1.32	1.69	1.63	1.63
$1 billion - $10 billion	1.75	1.72	1.93	2.04	1.73	1.78
More than $10 billion	—	—	—	3.34	3.32	4.25
Agricultural banks	1.65	1.82	1.80	1.99	2.08	2.09
Net Loan Losses[4]						
Less than $100 million	.16%	.14%	.18%	.23%	.29%	.36%
$100 million - $300 million	.19	.21	.18	.28	.28	.31
$300 million - $1 billion	.23	.17	.19	.36	.32	.39
$1 billion - $10 billion	.37	.33	.56	.66	.41	.56
More than $10 billion	—	—	—	1.09	.55	.54
Agricultural banks	.10	.12	.16	.19	.22	.32

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.