



REGIONAL ECONOMIST | APRIL 1994

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President's Message: Encouraging Community Reinvestment

Thomas C. Melzer

Over the past few years, the debate about whether banks are doing enough to extend credit in their local communities has heated up.

Currently, along with other regulators, the Federal Reserve is working on a proposal that would modify the regulations concerning the Community Reinvestment Act, which requires lenders to make loans to all segments of their communities, including low- to moderate-income areas.

The Fed has an important role in enforcing this law. Specifically, we are instructed to evaluate each state member bank's community reinvestment efforts and consider this sort of evaluation when we review an application for merger or change in bank operations, including at the bank holding company level. But the Fed plays another role—one that may have a far greater impact on fostering community development.

Since 1981, the Federal Reserve has acted as a liaison between local bankers and community-based organizations. Our activities focus on identifying community needs and lending opportunities and encouraging alliances between bankers and their communities. This approach is based on a basic belief: If CRA is to succeed, both the lender and the community must benefit from their alliance.

At the Federal Reserve Bank of St. Louis, this effort is carried out through our Community Affairs Office. The Office's goal is to further credit access by facilitating partnerships between community groups, local governments and lenders.

Our activities usually fall into one of three categories: helping banks meet their community credit needs, serving as an information broker, or handling protests of community groups regarding banking practices. These activities are carried out in a number of ways, but most involve one-on-one meetings with community leaders and lenders, informational programs and research into community and lending needs.

Although the results of Community Affairs activities are difficult to quantify, the impact our Office has had on community development becomes clear when one hears the success stories related to us by lenders and community members. According to these groups, the Fed is making a unique contribution to economic development by building bridges between communities and lenders, and identifying efforts that will benefit both.

Because the Fed's community affairs activities are not well known and because the effect they are having on community development in the Eighth Federal Reserve District is important, we chose this as the topic of our 1993 annual report. I encourage you to read it. To request a copy of the annual report, call 1-800-333-0810 ext. 8809 or (314) 444-8809.



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Are Minimum Wages Intrusive?

Adam M. Zaretsky

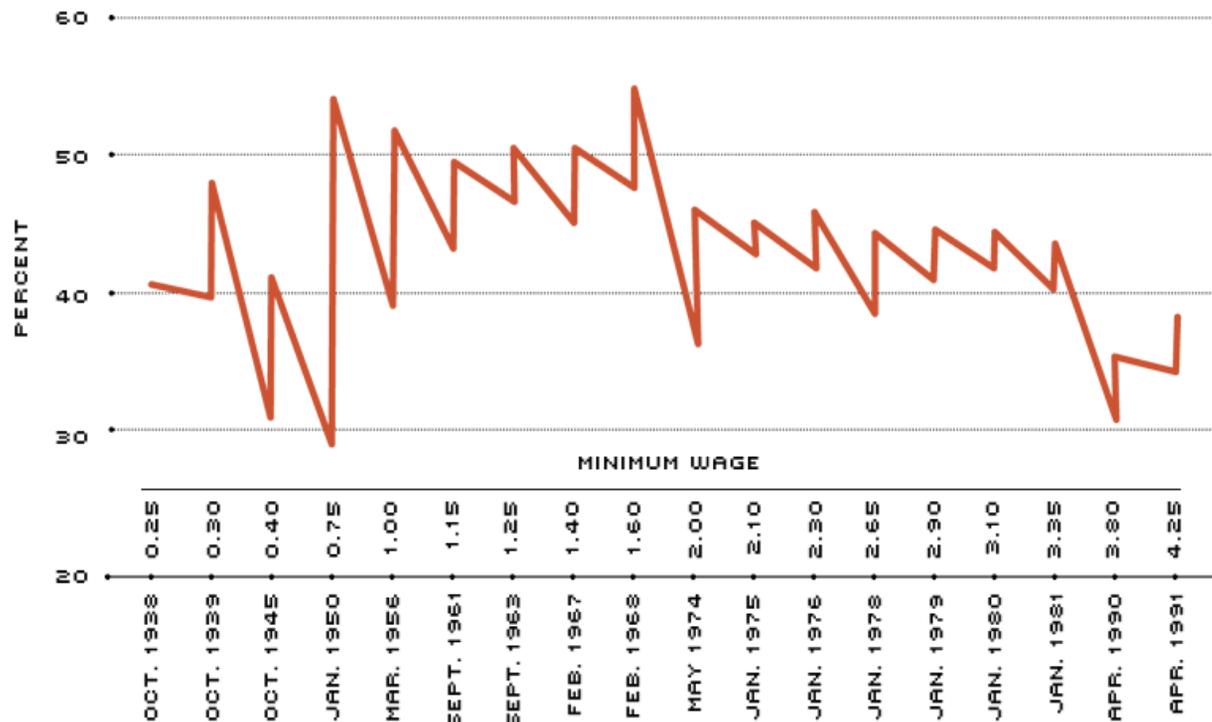
If there were but one issue economists could agree about overwhelmingly, it would have to be the minimum wage. Most economists agree not only that it is probably the most intrusive form of labor legislation, but also that its effects on employment can be accurately predicted. Testing these predictions with actual data, however, has proven more difficult than it first appeared, and lately, some evidence calls the established theory into question.

Why Have Minimum Wages?

The Fair Labor Standards Act of 1938 established the first federal minimum wage at \$0.25 per hour. Having recently suffered through the Great Depression, Congress worried that current labor conditions, which they found "detrimental to the maintenance of the minimum standard of living necessary for health, efficiency, and the general well-being of workers [would] spread and perpetuate, burden commerce, lead to labor disputes and interfere with the marketing of goods." Thus, the minimum wage was primarily intended to increase worker welfare. The accompanying chart illustrates subsequent increases in the minimum wage and its relation to the average hourly manufacturing wage of the time.¹ Interestingly, for most of the 1950s and '60s, the minimum wage averaged about 50 percent of the prevailing manufacturing wage; in the 1970s, the average ratio was about 45 percent; in the 1980s and '90s, this ratio has been about 37 percent.

Chart 1

The Minimum Wage as a Percent of the Average Hourly Manufacturing Wage



Vertical spikes represent the change in the minimum wage/manufacturing wage ratio after an increase in the minimum wage.

How a Change in the Minimum Wage Affects Employment: The Theory

Suppose a firm employs unskilled workers who receive the minimum wage and skilled workers who receive a higher wage because they are more experienced or more productive. Also suppose the firm is able to substitute skilled and unskilled labor, which are used in conjunction with capital to produce output. What outcomes should occur if the minimum wage is increased while all else remains the same?

When the minimum wage is increased, the firm reacts to two events simultaneously. One is that the price of unskilled labor increases while other wages stay the same. This makes unskilled labor relatively more expensive than skilled labor, causing the firm to hire more skilled labor and less unskilled labor. In other words, the firm substitutes skilled for unskilled labor. The other event is that the total cost of production rises, inducing a profit-maximizing firm to produce a lower level of output, which requires less of all inputs. This causes the firm to employ less of both skilled and unskilled labor.

Combining the outcomes of these two events, we see that a minimum wage increase causes the demand for unskilled labor to decline. Its effect on skilled labor, however, is ambiguous: The demand for skilled labor could decline if the employment losses associated with reduced output outweigh the employment gains associated with substitution; the demand could increase if the substitution effect dominates the output effect.

In an inflationary environment, the opposite outcomes can occur even if the dollar amount of the minimum wage stays the same because the purchasing power of these dollars declines. In other words, the purchasing power of the minimum wage declines if no action is taken to keep the dollar amount of the minimum wage in step with inflation.

How a Change in the Minimum Wage Affects Employment: The Findings

Because the majority of workers earning the minimum wage are teenagers, most minimum wage studies have focused on this age category. Essentially, there are two major sets of findings: those from the 1970s and early 1980s, and those from the early 1990s. This gap in the literature occurs primarily because there was no change in the federal minimum wage between 1981 and 1990, although several states during this period raised their minimum wages above the federal floor for the first time.

Brown, Gilroy and Kohen (1982) present a fairly comprehensive survey of the early literature. In a nutshell, they show that most of these studies draw a similar conclusion: A 10 percent increase in the minimum wage reduces teenage employment between 1 percent and 3 percent. Similarly, Brown, Gilroy and Kohen (1983) find that employment drops between 0.5 percent and 1.5 percent for each 10 percent increase in the minimum wage. These findings were quite appealing to economists because they substantiated theoretical predictions and demonstrated how government intervention in the market can be intrusive.

More recent studies, however, find that employment was not adversely affected by minimum wage increases and that, in some cases, it actually increased. In a study of California, for example, where the minimum wage was raised to \$4.25 per hour in 1988, Card (1992a) predicted an employment decline of between 3 percent and 8 percent. He found instead a 4 percent employment increase. Katz and Krueger (1992) and Card and Krueger (1993) performed similar studies of Texas and New Jersey using survey data from fast-food restaurants. These studies also found increases in employment after a minimum wage increase—in one case almost 13 percent. Moreover, both studies found that those firms most affected by the increase had the greatest employment gains.

Other recent studies by Taylor and Kim (1993) and Neumark and Wascher (1992) find more conventional outcomes: between 1 percent and 9 percent declines in teenage employment for each 10 percent increase in the minimum wage. A subsequent investigation into Neumark and Wascher by Card, Katz and Krueger (1993), though, led to conflicting conclusions, leaving the results open to debate. Further inquiries will no doubt be made before the matter is settled.

What Does This Mean for Minimum Wages?

The last round of studies suggests that (1) perhaps general labor market models do not apply to low-wage workers as readily as once thought, or (2) the minimum wage increases between 1990 and 1992 represent episodes that lie outside the general framework—that there were special circumstances driving these recent results. In either case, the argument against minimum wages because of their employment effects seems to be temporarily moot. On the other hand, there is little evidence to support the claim that minimum wages increase worker welfare either. Thus, it is hard to argue that the benefits of minimum wages outweigh an economist's aversion to interfering in reasonably competitive markets. Ultimately, as University of Michigan professor Charles Brown puts it, "the case against the minimum wage seems to...rest more upon that aversion than on the demonstrated severity of any harm done to those directly affected."³

Thomas A. Pollmann provided research assistance.

Endnotes

1. The coverage of minimum wage legislation has grown dramatically. At its inception in 1938, about 43 percent of the work force was subject to the minimum wage. Today, that figure is about 87 percent. The main exceptions are agricultural workers, some domestic and retail employees, executive, administrative and professional personnel. [back to text]
2. The following analysis can be quickly complicated to better reflect actual market conditions. For example, the fact that not all employees are covered by minimum wage laws can be included in the analysis. The main thrust of the outcome, however, would not change. A different story emerges, though, if the firm is not in a competitive labor market. [back to text]
3. Brown (1988), p. 144. [back to text]

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Home Sweet Home in the Eighth District

Michelle Clark Neely

Any way you slice it, the last two years have been good ones for residential construction and home sales in both the Eighth Federal Reserve District and the nation. Buoyed by a growing economy and the lowest long-term interest rates since the Johnson Administration, single-family building starts topped 1.29 million in the United States in 1993, the highest level in four years. And 1993 was nearly a record year for existing single-family home sales: The National Association of Realtors reports the sale of 3.8 million units, a 7.9 percent jump from 1992 and the highest level since 1979. In the District, all four major metropolitan areas—Little Rock, Louisville, Memphis and St. Louis—recorded increases in single-family building permits and single-family home sales in the last two years.

Rates Head South

Declines in long-term interest rates deserve much of the credit for the rebound in housing. Since peaking at about 10.75 percent in mid-1990—just before the onset of the 1990-91 recession—the monthly average rate on an FHA 30-year, fixed-rate mortgage has declined more than 3 percentage points. There were some periods in the fall of 1993 when it even fell below 7 percent, a level not seen since the late 1960s. And one-year adjustable rate mortgages tied to the one-year Treasury bill have dipped as low as 3.24 percent in the last year.

Falling interest rates typically stimulate the demand for housing and household goods. When rates drop significantly, homeowners can refinance their existing mortgages, either lowering their monthly payments, mortgage terms or both, freeing up financial resources for other uses. Homeowners also have an incentive to trade up, selling their current home and purchasing a more expensive one.

For first-time homebuyers, declining rates can shift the calculus from renting to buying. Even a small decline in interest rates can have a substantial impact on housing affordability. At 7 percent, a 30-year \$100,000 mortgage commands a monthly payment of \$665.30 compared with \$804.62 on the same mortgage at 9 percent. The monthly payment is further reduced by the effects of the federal tax deduction for mortgage interest paid; for many families this "effective" monthly payment is less than rent. Combine the interest rate and tax effects with rising employment and rising median incomes and the result is increased housing demand and increased affordability.

As Housing Goes...

Housing has long been considered an important barometer of economic health. New construction makes a direct contribution to the nation's total output, or gross domestic product (GDP), as does the production of furniture, appliances and other household goods that depend on the health of the housing sector.

Interestingly, construction and its related industries are important components of GDP and important *indicators* of the economy's strength. Homebuilding and homebuying tend to be strongest when the economy is

expanding and long-term interest rates are low. Because a house represents for most people their single largest liability (or asset when the mortgage is paid off), the decision to purchase a house is closely related to job security and other measures of financial security and wealth.

Location, Location, Location

While the entire country has benefited from the decline in long-term interest rates, not all housing markets have performed equally well. Regional differences in housing demand and supply are primarily the result of differences in local economic conditions. In the most recent economic cycle, the middle of the country has fared much better than either of the coasts, and that difference is reflected in housing affordability and construction activity.

According to recent data analyzed by the National Association of Home Builders (NAHB), the midwestern and southern portions of the United States—which the Eighth District straddles—are home to the nation's most affordable housing markets. The NAHB computes a quarterly housing affordability index—dubbed the Housing Opportunity Index (HOI)—to assess trends in homebuying potential in approximately 200 metropolitan areas. The HOI measures the ability of a typical family to purchase a home in its own market by comparing median family income with the median home price, at prevailing interest rates. For the nation as a whole, the HOI was 65.1 in the third quarter of 1993: U.S. households earning the median income of \$39,700 could afford to purchase just over 65 percent of the homes offered for sale that quarter.¹

Table 1

Housing Affordability in the Eighth District

3rd Quarter 1993

National Rank	Metro Area	HOI*	Median Income	Median Price
63	Columbia, MO	83.8	\$39,100	\$86,000
87	Fayetteville-Springdale, AR	80.4	32,500	75,000
88	St. Louis, MO-IL	79.9	43,700	100,000
109	Louisville, KY-IN	77.0	36,500	79,000
127	Little Rock-North Little Rock, AR	74.1	36,400	91,000
149	Memphis, TN-AR-MS	68.7	35,300	100,000
	United States	65.1	39,700	110,000

*Housing Opportunity Index

SOURCE: National Association of Home Builders

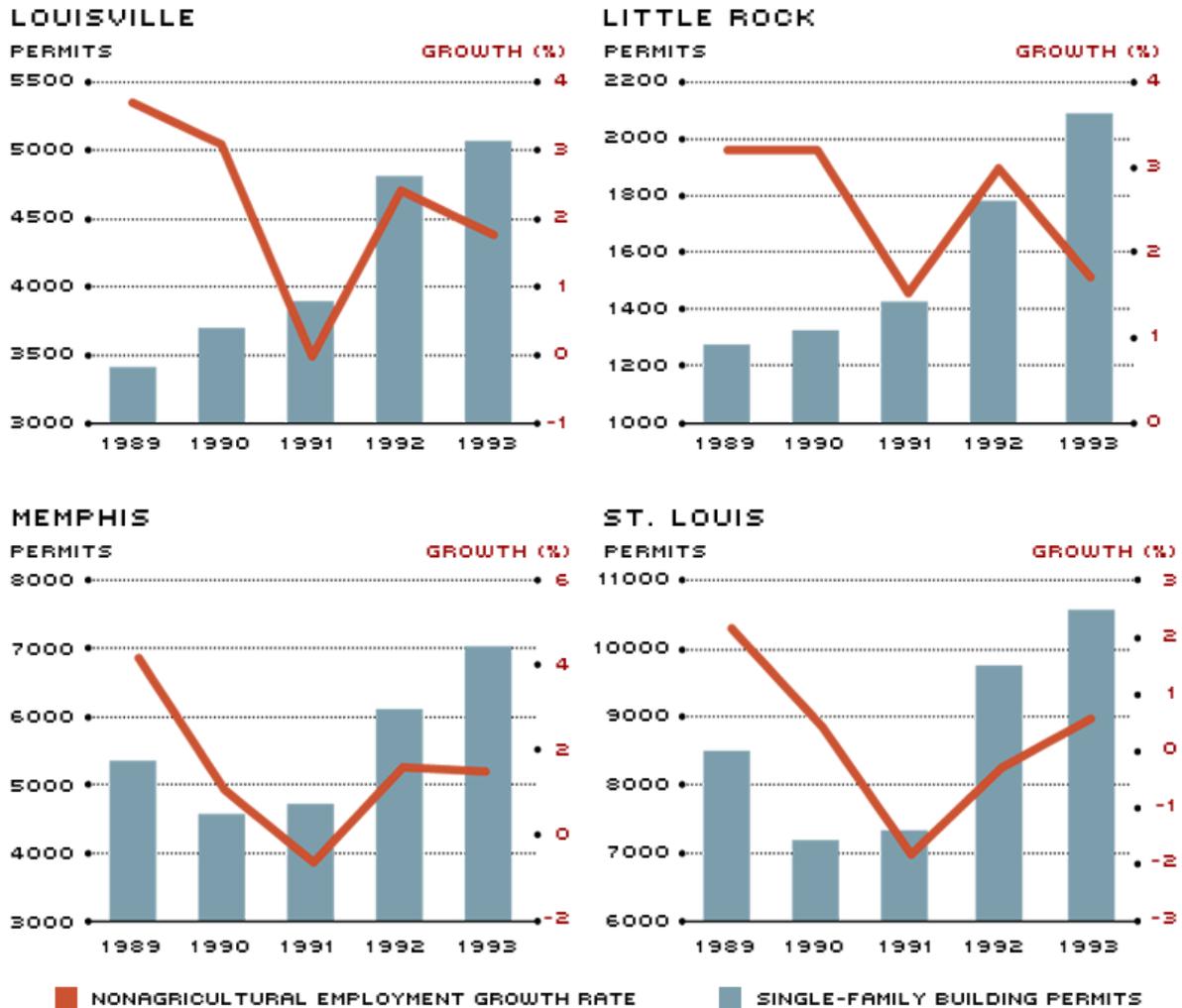
The table shows the indexes for the six District metropolitan areas included in the NAHB's survey. All six recorded HOIs that exceeded the national average. In Columbia, Missouri, the District's most affordable market, 83.8 percent of all households earning the area's median income of \$39,100 could afford a house at the area's median price of \$86,000. According to the NAHB, Memphis, while still above the national average, was the least affordable of the six cities with an HOI of 68.7. Though the median home price in Memphis

equaled that of St. Louis (\$100,000), a higher median income in St. Louis (\$43,700 vs. \$35,300) accounts for the large difference in affordability between the two areas.

The pace of economic activity helps explain not only the rebound in District housing markets, but also their relative strength. Most areas of the District were hit less hard during the most recent recession than the rest of the nation, with smaller declines in employment and other measures of economic activity, including housing permits. For example, while U.S. payroll employment declined at an annual rate of 1.8 percent during the recession, District payroll employment declined at a 1.2 percent annual rate.² Since the recession, employment growth in the District has generally exceeded the national average. The close relationship between local economic growth and local construction activity is illustrated in the chart. Looking at the District's four major metropolitan areas, a clear pattern emerges: the trend in single-family permits issued tracks very closely the trend in area economic growth (proxied by employment growth).³ For example, in the last five years, all four metro areas experienced their greatest improvement in single-family permit issuance in the same year (1992) in which payroll employment grew the most.

Chart 1

A Healthy Economy is the Key to Housing



SOURCE: U.S. Bureau of the Census and state employment offices

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What's Ahead?

Most analysts expect 1994 to be another good year for new single-family home construction and sales nationwide. In the District, poor weather in 1993 created a backlog for builders, which should sustain much of the past year's momentum well into 1994. But the outlook is not all rosy, as rising long-term interest rates and increased materials costs (especially lumber) threaten to price some potential buyers out of the market. As long as interest rates and new home prices pick up only modestly, however, "there's no place like home" should continue to ring true across the district.

Thomas A. Pollmann provided research assistance.

Endnotes

1. According to the mortgage underwriting standards used for calculating this index, a family could afford to purchase a home equal to 3.5 times its annual income at the prevailing mortgage interest rate, assuming a down payment of 10 percent. The interest rate used in this index was 7.04 percent for the third quarter of 1993, an average for all fixed and conventional mortgages closed as reported by the Federal Housing Finance Board. [back to text]
2. For more detailed analysis, see Kevin L. Kliesen, "Some Upbeat Trends in District Employment," *The Regional Economist*, April 1993. [back to text]
3. Permit data are annual levels. Employment growth rates are calculated as compounded annual average growth rates. [back to text]



The Economics of Natural Disasters

Kevin L. Kliesen

"What has so often excited wonder [is] the great rapidity with which countries recover from a state of devastation; the disappearance, in a short time, of all traces of the mischiefs done by earthquakes, floods, hurricanes, and the ravages of war."

—John Stuart Mill

Few regions of the country have escaped the wrath of Mother Nature recently. While every year has its share of calamities, the past few years have seen an extraordinary spate of natural disasters and atypical weather. The economic losses from these events have been considerable: Since 1989, insurance companies have paid out more than \$44 billion in damage claims stemming from blizzards, hurricanes, earthquakes, tornadoes, floods, droughts, mudslides, wildfires and other assorted maladies. Altogether, these calamities have cost the economy dearly in terms of lost wages and output, utility disruptions, destruction of public and private property, additional commuter time and transportation costs and hundreds of lives.

The nature of these destructive events—as well as their effect on the economy—varies considerably. Some natural disasters, like tornadoes, hurricanes and earthquakes, tend to be short-lived events, lasting several seconds to a few hours, but causing substantial destruction in a concentrated area. Others, like droughts or major floods, tend to be of a longer duration, spreading their damaging effects over a relatively larger expanse for days or weeks. Any type of disaster, however, can leave an economic imprint that lingers for years.

Estimating Disaster Losses: An Imprecise Science

Natural disasters typically set in motion a complex chain of events that can disrupt both the local economy and, in severe cases, the national economy. Calculating the damages of such an event can be an onerous task because the cost of a natural disaster is ultimately wedded to several factors, and—more importantly—varies by type of disaster. Among the key influences are the magnitude and duration of the event, the structure of the local economy, the geographical area affected, the population base and the time of day it occurred. Naturally, disasters that affect densely populated areas have the greatest potential for inflicting the most damage. Not only are large numbers of people endangered, but the potential loss to homes, businesses, highways, roads, bridges and utilities is also magnified. It is not surprising then that Hurricane Andrew, which affected a populous area of southern Florida, still registers as the most costly natural disaster of all time, even though the 1993 floods affected nine Midwestern states and lasted for a much longer period.

One characteristic common to all natural disasters is that damage estimates calculated shortly afterward tend to be significantly overstated, hardly more than back-of-the-envelope calculations. Some estimates in the immediate aftermath of Hurricane Andrew put the damages as high as \$60 billion, two to three times its projected final total. Similarly, initial damage estimates of the Great Flood reached as high as \$30 billion, perhaps more than double its projected final tally. A similar pattern occurred recently after the Northridge (Los Angeles) earthquake.

The factors that contribute to the over-estimation of losses vary considerably. In some cases, buildings, infrastructure and crops that appear totally destroyed may in fact be only partially damaged. To some extent, this phenomenon may be driven by the media, who are merely striving to add a monetary flavor to the disaster. Other factors also come into play. According to some economists who have studied natural disasters, there is an incentive for states to overestimate their losses in order to maximize their political leverage over federal disaster assistance dollars.¹

The Principles of Loss Assessment

Up to now, we have discussed the cost of a natural disaster and the losses that stem from a natural disaster as if they are one and the same; economically they are two separate terms.² Losses occur principally through destruction of an economy's wealth—the physical assets that help generate income (see table). These assets include levees, roads, bridges, utilities, factories, homes, buildings, farmland, forests or other natural resources. To correctly measure these losses, one must attempt to calculate either the lost income that these physical assets help generate, or the decline in the assets' values. To count both is to double count. By contrast, costs are incurred when an economy undertakes to replace, repair or reinforce those tangible assets (capital) that are destroyed; this includes the buttressing of structures beforehand (for example, the construction of levees or seawalls, or the reinforcement of bridges or buildings in earthquake prone areas).

Table 1

Calculating the Economic Effects of Natural Disasters: Some Definitions and Concepts

Term	Definition	Example
Losses	Change in wealth caused by damage to structures or other physical assets	Houses, buildings and structures are damaged, crops and forests destroyed, landslide damages
Direct vs. Indirect Losses	Direct losses are those resulting from building, lifeline, and infrastructure damages. Indirect losses are those that follow from the physical damages.	Direct losses: building damages, bridge collapse, loss of lives. Indirect losses: commuter disruptions, loss of local tax revenues, reduced tourism
Market vs. Non-market Effects	Market effects are those that are reflected in national income accounts data; Non-market effects do not appear in the national income accounts data	Market effect: loss of income due to disaster-caused destruction. Nonmarket effects: loss of leisure time due to longer commute as a result of the disaster.
Costs	Highest-valued of foregone alternative use of a resource	Mitigation expenditures undertaken before the disaster occurs, (for example, construction of levees or seawalls or reinforcement of buildings) and reconstruction of buildings, etc. during recovery period
Redistribution	Transfer of wealth between individuals or governments	Federal disaster relief, but also includes transfers that occur because resources or production are moved to a new region
Wealth	Present value of the income stream from the productive assets of society	The value of a forest or farmland is the sum of the flow of monetary benefits (income from sales of timber or crops) and non-monetary benefits (vistas and recreational benefits of a forest)

SOURCE: Adapted from Brookshire and McKee (FEMA, July 1992), p. 282.

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Disaster losses manifest themselves in numerous ways and, unfortunately, can never be estimated with absolute certainty. When correctly calculating losses, an analyst must account for several factors that are often overlooked, intertwined or extremely difficult to measure (see table). For example, how do you determine the true value of a levee, a public bridge or a sewage treatment plant? Economists believe that the true value of a physical asset is its present discounted value, but calculating this value involves a degree of subjective judgment.³ A structure's market value is probably the next best alternative, but this measure also presents problems because some physical assets are not traded in the marketplace; thus, determining their true market value is next to impossible. Therefore, for lack of reliable information, analysts often use the asset's replacement cost. Endless other issues also arise. How do you measure the decline in property values that sometimes occurs in the vicinity of the disaster area? What prices and production should you attach to crops that were washed away before harvest, or livestock that were unable to gain weight during severe weather? Finally, how do you calculate the expected lifetime earnings of individuals who perished?

Despite these limitations, economists attempt to measure the total loss of a disaster by estimating two separate types of losses: direct and indirect. *Direct losses* are easier to estimate. For example, in an earthquake or hurricane, they would consist of the buildings or structures that are destroyed or damaged as a result of the actual force; in the case of a flood, they would consist of water damage to levees, crops or

buildings. *Indirect*, or secondary, losses occur as a result of destruction to buildings, structures or bridges. These include lost output, retail sales, wages and work time, additional time commuting to work (reduced leisure), additional costs to business from rerouting goods and services around the affected area, utility disruptions, reduced taxable receipts, lost tourism or increased financial market volatility. Obviously, calculating indirect losses is the more difficult of the two.

The Recovery Period: A Fiscal Expansion?

One can picture a natural disaster as a time line consisting of three distinct periods. In period 1, losses to buildings, highways and other infrastructure (direct losses) occur; in period 2, indirect losses such as lost output and reductions in employment, leisure time and taxable receipts occur. Finally, in period 3, a recovery ensues: Rebuilding and cleanup efforts generate temporary increases in retail sales of such items as construction materials and nonperishable items like batteries, charcoal and canned foodstuffs. Damaged or destroyed goods like clothing, furniture and other household items are replaced, and roads, bridges or other structures are repaired or rebuilt.

This rebuilding activity usually generates both increased sales tax receipts and additional employment. Thus, one ironic feature of a disaster is that it spurs the pace of economic activity in the affected region. An additional positive effect occurs as the economy's destroyed physical assets are replaced with assets that incorporate more advanced technology. By enhancing the productivity of a community's physical assets, incomes will typically be enhanced as well.

In general, though, the net economic effect of the recovery period depends on several factors.⁴ First is the stage of the business cycle that the local or regional economy was in. Was it, for example, experiencing strong growth prior to the disaster, or was the economy in a recession? A second factor influencing the recovery period is the timing and extent of disaster assistance monies from federal and state and local governments. Although emergency funds for food and shelter are usually disbursed immediately by Presidential directive, monies for longer-term rebuilding efforts are often appropriated by Congress with a substantial lag. For example, the bill that appropriated funds for the Northridge earthquake in February 1994 also included funds for the 1993 Midwest flood and the 1989 Loma Prieta (San Francisco) earthquake.

Third, in many cases, the jobs and incomes generated in the recovery period do not stay in the local economy; rather, outside contractors that specialize in the cleanup, rebuilding and renovation activities are often brought in. For instance, a study conducted in the aftermath of Hurricane Frederic in 1979 suggests that the net economic effect of the disaster was negative because of this leakage.⁵

Finally, the percentage of total losses that are insured also affects the recovery. The lower the percentage of insured losses, the greater the dependency the local economy affected becomes on private and government monies. Not surprisingly, insured losses vary substantially by disaster. For example, estimates of insured losses from Hurricane Andrew at last count were approximately \$15.5 billion (total losses are estimated between \$25 billion to \$30 billion), while insured losses from the 1989 San Francisco earthquake were only \$960 million (total loss estimate is placed at \$7.6 billion to \$12.6 billion).⁶

Monies from private organizations, such as the Red Cross, are also disbursed. Total Red Cross disbursements to Midwest flood victims last year totaled \$44.6 million; while significant, private funds tend to be small in relation to total losses.

Waterlogged: A Tale of Two Floods

Last year's flooding in the St. Louis area resulted in the Mississippi River staying above flood stage for a record 79 days, besting the 1973 flood's previous record by two days; flood stage in St. Louis occurs at 30 feet.* The 1993 flood also holds the record river crest in St. Louis at 49.58 feet on August 1, again besting the previous record set in 1973 of 43.3 feet.

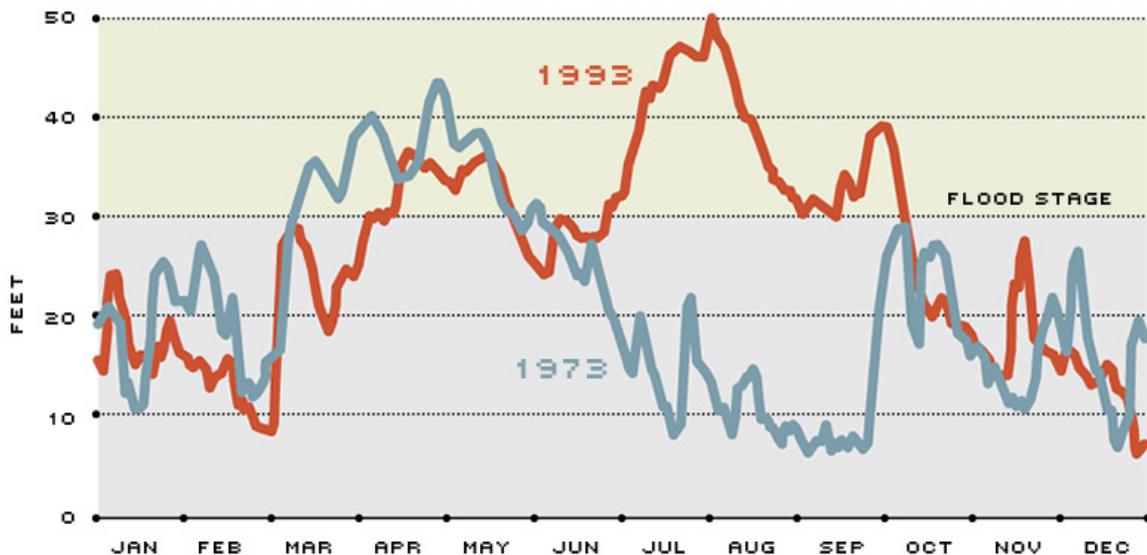
Typically, floods in the Mississippi River Basin occur in the springtime. The 1993 flood was unusual in that the bulk of it occurred during the summer months, although flooding of a lesser magnitude did occur during the spring (see chart below). What distinguished the 1993 flood from others was the substantial precipitation that occurred during early summer months—when river levels were already at or near flood stage in many areas.

Can it happen again this year? According to the National Weather Service, three key ingredients are necessary to precipitate a flooding of the magnitude seen last year: (1) saturated springtime soil conditions, (2) unusually high river levels that develop over the winter and (3) a persistent weather pattern to continually feed ample amounts of Gulf moisture into the Midwest.

Already the first two conditions have been met in some parts of the country, particularly in parts of the Mississippi and Ohio River Valleys. It is much too early, however, to determine whether the 500-year flood will return for an encore performance.

**A river's flood stage is set in relation to its elevation above sea level—not its height above the bottom of the river channel. For example, in St. Louis, "zero" is designated at 379.94 feet above sea level. Thus, if the Mississippi River reaches a level of 30 feet (flood stage), it simply means that the river is 30 feet above this "zero" designation.*

Daily River Stage in St. Louis



Case Study: The Great Flood of 1993

The disaster of record last year was the so-called Great Flood of 1993. Occurring primarily along states that border the upper and middle Mississippi River Basin or tributaries that feed into the Mississippi, the damage was so widespread that more than 500 counties in nine states—including the entire state of Iowa—were designated natural disaster areas. In the St. Louis area, it eclipsed the previous record flood in 1973.

A major flood has the capacity to affect numerous sectors of the economy—everything from agriculture to manufacturing to transportation. As a result, estimating flood losses is a time-consuming process, fraught with uncertainty. Besides the obvious damage to public and private structures, other damages occur that are often hidden, appearing only after the fact. Examples include reduced fertility of farmland, weakened structural foundations of buildings, or waterlogged roads and bridges whose deterioration is exposed only during the winter months. Other factors, such as transportation delays and increased volatility of crop and livestock markets, also must be accounted for, however imprecisely.

Not surprisingly, estimates abound as to the economic impact of the Great Flood. Most rank this flood second in terms of the costliest natural disasters of all time, just behind Hurricane Andrew in 1992. Unfortunately, detailed loss estimates by the Army Corps of Engineers and the National Weather Service will not be released until later this year; the few estimates that do exist—hardly more than rough guesses—often fail to distinguish between direct and indirect losses. Nevertheless, most accounts estimate the flood losses in the \$10 billion to \$20 billion range, with a large percentage of those losses uninsured. According to the Insurance Information Institute, insured nonagricultural losses were about \$755 million; insured crop losses are put at an additional \$250 million. Typically, insured flood losses are a smaller percentage of total losses than those associated with a hurricane or earthquake. For this flood they are estimated to be approximately 5 percent to 10 percent of total losses. By this rule of thumb, one could plausibly estimate the total losses from the Great Flood to be between \$10.5 billion and \$20.1 billion.

Sectors Affected

Although the flood affected several important sectors of the economy, the disruptions to transportation were arguably the greatest. According to Association of American Railroads (AAR), the flood caused numerous disruptions and forced many railroads to lay emergency tracks to prevent manufacturers—especially automotive plants—from closing because they employ the just-in-time inventory system. The AAR calculates that railroads incurred direct losses of \$131 million—primarily physical destruction of rail lines, bridges and signaling equipment. Another \$51 million in indirect losses were incurred in the rerouting of trains. The AAR believes that other indirect losses (for example, business interruptions and lost revenue) could reach as high as \$100 million.⁷

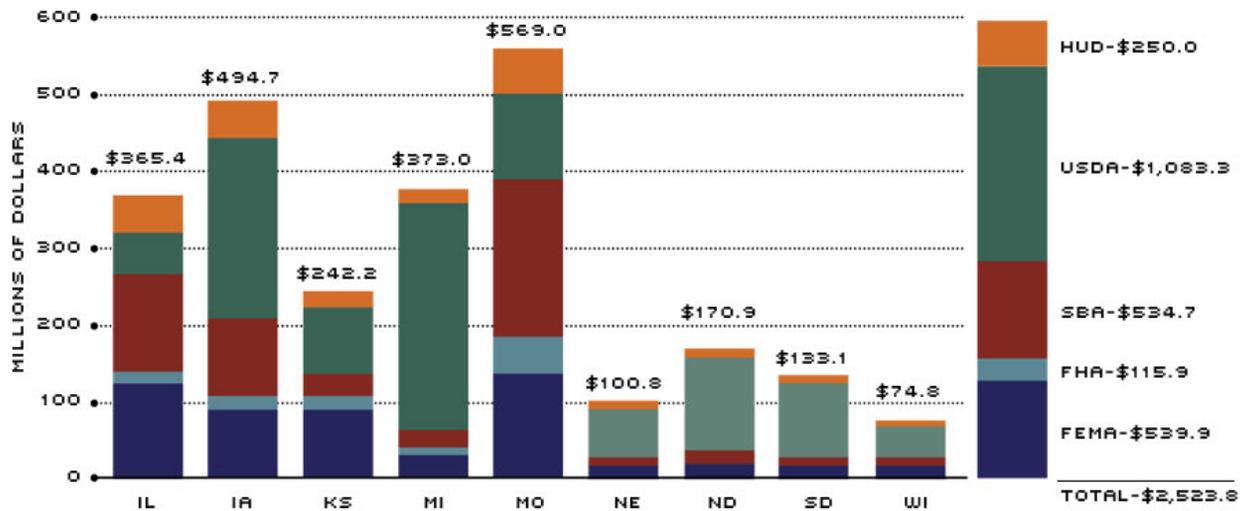
Trucklines and bargelines were also affected. The Upper Mississippi River Basin is an important transportation lifeline, moving a significant percentage of the nation's grain, coal, chemicals, fertilizers and other goods. The Maritime Administration estimates that indirect flood losses totaled nearly \$284.5 million, more than three-quarters of which affected operators in Illinois and Missouri.⁸

Agriculture also incurred significant losses. The United States Department of Agriculture (USDA) has disbursed \$531.6 million in disaster assistance to nearly 150,000 producers and another \$513.2 million in crop insurance losses. Of this nearly \$1.1 billion, farmers in Iowa and Minnesota received almost half the total. In the Eighth Federal Reserve District, farmers in Illinois received \$44.6 million, while those in Missouri received \$98.4 million.

Disbursements from the USDA were but one form of federal assistance. As Chart 2 shows, other federal agencies have also distributed monies. In sum, the federal government has disbursed just over \$2.5 billion in funds. This number will rise steadily over time, however, as state and local governments negotiate with the federal government about the eventual repair costs for community structures, such as bridges, utilities and buildings. This injection of federal monies is what leads many economists to refer to the recovery as expansionary fiscal policy.

Chart 2

Disbursement To Date of Federal Funds to Flood-Affected States



Several agencies can be called upon to provide disaster assistance. Typically, applications are first made to the Federal Emergency Management Agency (FEMA). FEMA determines eligibility and directs applicants to the appropriate federal agency. If applicants fall below certain income requirements, they can apply for assistance through FEMA's housing and family grant program; otherwise, they are directed to the Small Business Administration (SBA), which makes low-interest loans to homeowners. The SBA also extends such loans to small businesses for repair of physical damages and for operating capital. State and local governments receive aid from FEMA's public assistance program. This aid is intended for many purposes, including repair and replacement of damaged public property and public schools, as well as disaster clean-up. FEMA grants usually require governments to bear at least 25 percent of the cost; this burden was lowered to 10 percent for the Midwest floods. Aid to state and local governments is also available from the Department of Housing and Urban Development's (HUD) community development block grant program. Monies for infrastructure repair are also available from the Federal Highway Administration (FHA). The FHA allocates money for federal highway and bridge repair; most state roads and bridges also fall under this program. Finally, assistance to farmers comes from the U.S. Department of Agriculture (USDA), which provides crop disaster payments and, for those who purchase it, crop insurance payments. Most farmers are eligible for disaster aid; those enrolled in USDA set-aside programs, however, are eligible for a higher level of aid.

NOTE: Figures may not add because of rounding

SOURCE: Individual federal and state government agencies.

[back to text]

How Natural Disasters Can Change Economic Perceptions at the National Level

Typically, the largest effects on output, employment, wages and the capital stock occur at the local or regional level. But a natural disaster can sometimes skew the numbers at the national level if economic activity is sufficiently impeded across regions of the country, or if it affects a large enough percentage of the population or an important industry. In the first quarter of this year, for example, the economy was buffeted by the Northridge earthquake and winter storms in the South, Midwest and East. Altogether, these events affected about one-half of the U.S. population, disrupted construction in the housing industry and caused significant reductions in the output of automobiles, steel and appliances (although the harsh weather actually boosted output at the nation's utilities and mines).⁹ The effect on total output from these temporary disruptions will

probably be minor; nevertheless, some economists have revised downward their estimates for economic growth in the first quarter.

What is interesting about this scenario is that a similar scenario occurred in the first quarter of 1993, when the East Coast suffered through what the National Weather Service dubbed the "storm of the century." At the beginning of 1993, most economists were expecting the economy to grow at about a 3 percent rate. When the first quarter 1993 GDP growth rate came in substantially below expectations at 0.8 percent, many economists attributed it to the adverse weather, because important measures such as retail sales and construction activity fell sharply. Although many series rebounded in April, as expected, the second quarter real GDP growth rate was also below expectations, making it apparent that the first quarter's weakness was not entirely weather-related. Thus, in determining the economic effects of a disaster on the national economy, one must first attempt to ferret out the normal ebbs and flows of the business cycle. While such a task is difficult, to do otherwise may give a misleading picture of the economy's overall strength. For instance, weather-related phenomena perceived as temporary may cause firms to overproduce, not realizing that aggregate demand may be weakening for unrelated reasons.

Conclusion

Most of the United States is susceptible to some kind of natural disaster. As a result, natural disasters will exact their toll on local or regional economies on a continuing basis. Because the avenues of influence traverse through many economic sectors and affect many individuals and, moreover, are intertwined in innumerable and unseen ways, calculating the true economic effect of a natural disaster is an arduous task. In the final analysis, though, as John Stuart Mill pointed out more than 100 years ago, the economy ultimately recovers and prospers once again.

Heidi L. Beyer provided research assistance.

Endnotes

1. See Dacy and Kunreuther (1969, pp. 9-10). [back to text]
2. This section draws heavily from FEMA (1992). [back to text]
3. The present value of an asset is determined by the amount of income it can generate now and in the future; a good example is an acre of farmland. This income will vary depending on the expected interest rate (termed the discount rate) used for converting the value of future income flows to the present. In all likelihood, the expected income and the discount rate will change over time because of changing market conditions. [back to text]
4. Although the recovery period tends to temporarily bolster economic activity (a plus), the disaster itself, by destroying some of the economy's physical and human capital stock, acts to depress the level of economic activity. The net long-run effect is thought to be positive in most instances, however. [back to text]
5. See Chang (1984). [back to text]
6. Insured loss estimates were kindly provided by Jeanne Salvatore of the Insurance Information Institute (New York). [back to text]
7. See Association of American Railroads (1993). [back to text]
8. See U.S. Department of Transportation (1993). [back to text]
9. Just as with the Great Flood, these storms exposed one shortcoming of the just-in-time inventory system that many manufacturers currently employ to reduce costs. When transportation disruptions occur—for example, rail or highway closures—plants that carry only one or two days inventory of parts are at the mercy of the weather. [back to text]

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ABOUT THE AUTHOR



Kevin L. Kliesen

Kevin L. Kliesen is a business economist and research officer at the Federal Reserve Bank of St. Louis. His research interests include business economics, and monetary and fiscal policy analysis. He joined the St. Louis Fed in 1988. Read more about the author and his

research.



Pieces of Eight: News Bulletins from the Eighth Federal Reserve District

What Do Employment Statistics Really Tell Us?

If a person starts a job at a new manufacturing plant or leaves a job to care for a child, the result is a flow of workers into and out of employment. Ordinarily, these flows are condensed into a single statistic, the net change in employment. According to St. Louis Fed economist Joseph A. Ritter, this statistic hides an interesting and informative dimension of the labor market: the gross number of jobs created and destroyed.

In the current issue of the St. Louis Fed's bimonthly research publication, *Review*, Ritter examines three approaches to measuring the flows of workers and jobs and illustrates some striking features of the U.S. labor market. For example, falling employment during recessions usually results from dramatic increases in job destruction rather than drops in job creation. Job creation usually rises sharply during recoveries. But the most recent recession was a typical; job destruction rose much less than usual, and there was no surge in job creation during the recovery. For a copy of the *Review*, please call Debbie Dawe at (314) 444-8809.

An Important Source of Economic Information

To keep the U.S. economy on track, the Fed regularly takes the economic pulse of the 12 Reserve Districts. One of the ways it does this is in regular meeting with various groups of bankers and business leaders, like the Federal Advisory Council or FAC.

Established by the Federal Reserve Act, the FAC consists of one representative from each of the 12 Federal Reserve districts. The council confers at least four times each year with the Board of Governors on economic and banking developments and makes recommendations on Federal Reserve System activities. FAC representatives may be reappointed and can serve a maximum of three one-year terms.

The Eighth District's current FAC representative is Andrew B. Craig III, chairman, president and chief executive officer of Boatmen's Bancshares, Inc.

Federal Reserve Offers Tours

While thousands of people pass the St. Louis Fed each day, few have ventured inside its doors.

To help educate the public on the Federal Reserve System, the St. Louis Fed offers free tours Monday through Friday at 9:30 a.m. and 1:30 p.m. Tours last approximately 45 minutes and can be varied to suit the interests of a particular group.

While on tour, visitors see millions of dollars stored in the Fed's vault and the massive equipment used to sort currency and detect counterfeit bills. They also see the check processing equipment that reads and sorts

thousands of checks every hour and the Fed's modern security system. Tour guides explain why the Fed was created and discuss its role in the U.S. economy.

Tours are available to anyone high school age or above. Please call at least three weeks before your desired tour date. For more information about the tour program at the head office, call Debbie Bangert at (314) 444-8421. For tours of one of the branches, call: Little Rock, Marilyn Burrows, (501) 324-8262; Louisville, Ruth Hollowell (502) 568-9271; Memphis, Brenda Gates (901) 579-2449.

Percentage of Interstate Highway Mileage Rated in Poor Condition, 1989

Rank Among 50 States	District State	Percent
7	Arkansas	2.6%
15	Illinois	5.5
24	Kentucky	8.4
28	Missouri	9.4
31	Tennessee	10.3
39	Indiana	12.6
46	Mississippi	18.9

SOURCE: U.S. Department of Transportation, Federal Highway Administration

District Data

Selected economic indicators of banking,
agricultural and business conditions in
the Eighth Federal Reserve District

Commercial Bank Performance Ratios

U.S., District and State

	All U.S.	U.S. <\$15B ¹	District	AR	IL	IN	KY	MS	MO	TN
Return on Average Assets (Annualized)										
4th quarter 1993	1.22%	1.27%	1.27%	1.40%	1.39%	1.18%	1.12%	1.31%	1.24%	1.29%
3rd quarter 1993	1.22	1.25	1.27	1.41	1.44	1.20	1.10	1.38	1.21	1.32
4th quarter 1992	0.94	1.04	1.14	1.34	1.17	1.05	1.03	1.18	1.09	1.15
Return on Average Equity (Annualized)										
4th quarter 1993	15.64%	15.13%	14.89%	15.50%	14.63%	12.62%	13.20%	14.28%	15.58%	16.75%
3rd quarter 1993	15.71	15.00	14.99	15.62	15.29	12.83	12.98	15.09	15.27	17.28
4th quarter 1992	13.18	13.20	13.92	15.44	13.12	11.81	12.69	12.97	14.09	15.89
Net Interest Margin (Annualized)										
4th quarter 1993	4.49%	4.86%	4.52%	4.51%	4.82%	4.43%	4.43%	4.97%	4.34%	4.62%
3rd quarter 1993	4.49	4.84	4.53	4.55	4.89	4.47	4.33	4.97	4.38	4.66
4th quarter 1992	4.53	4.87	4.48	4.62	4.61	4.57	4.28	5.08	4.27	4.62
Nonperforming Loans² ÷ Total Loans										
4th quarter 1993	1.99%	1.60%	0.85%	0.87%	1.20%	0.62%	0.73%	0.84%	0.84%	0.89%
3rd quarter 1993	2.40	1.89	0.99	0.91	1.24	0.61	1.04	0.86	0.97	1.05
4th quarter 1992	3.09	2.27	1.31	1.16	1.49	0.87	1.35	1.16	1.43	1.25
Net Loan Losses ÷ Average Total Loans (Annualized)										
4th quarter 1993	0.83%	0.71%	0.36%	0.15%	0.44%	0.18%	0.47%	0.35%	0.35%	0.49%
3rd quarter 1993	0.80	0.69	0.35	0.12	0.39	0.16	0.45	0.35	0.35	0.47
4th quarter 1992	1.26	1.08	0.64	0.38	0.78	0.50	0.83	0.60	0.53	0.86
Loan Loss Reserve ÷ Total Loans										
4th quarter 1993	2.43%	2.19%	1.76%	1.56%	1.77%	1.48%	1.65%	1.71%	1.96%	1.87%
3rd quarter 1993	2.53	2.27	1.80	1.58	1.83	1.49	1.70	1.69	1.95	2.04
4th quarter 1992	2.65	2.41	1.81	1.63	1.79	1.45	1.68	1.73	1.96	2.07

NOTE: Data include only that portion of the state within Eighth District boundaries.

¹ U.S. banks with average assets of less than \$15 billion are shown separately to make comparisons with District banks more meaningful, as there are no District banks with average assets greater than \$15 billion.

² Includes loans 90 days or more past due and nonaccrual loans

SOURCE: FFIEC Reports of Condition and Income for Insured Commercial Banks

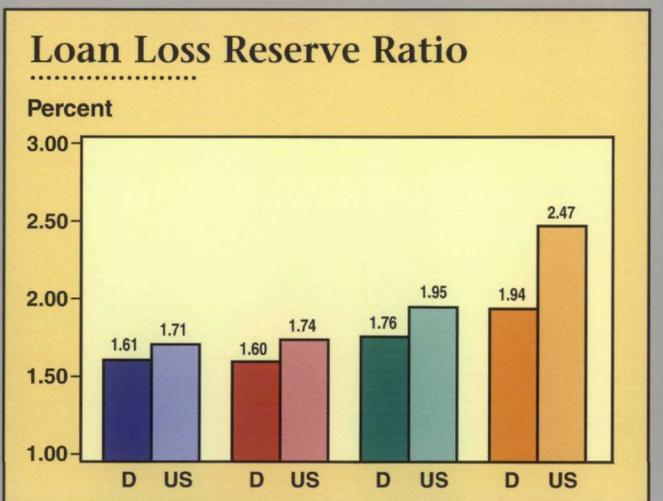
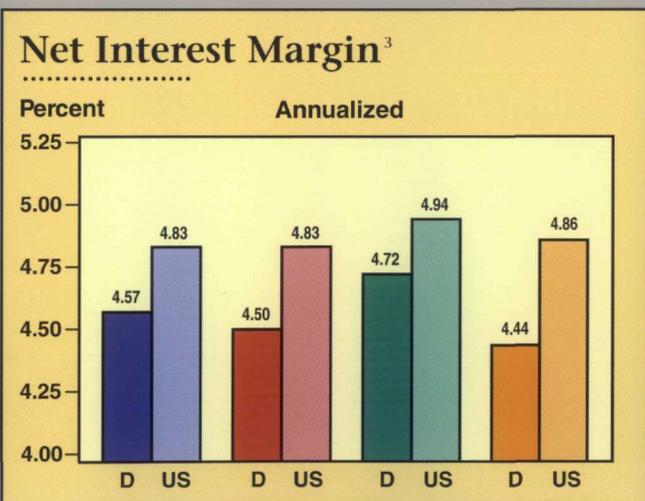
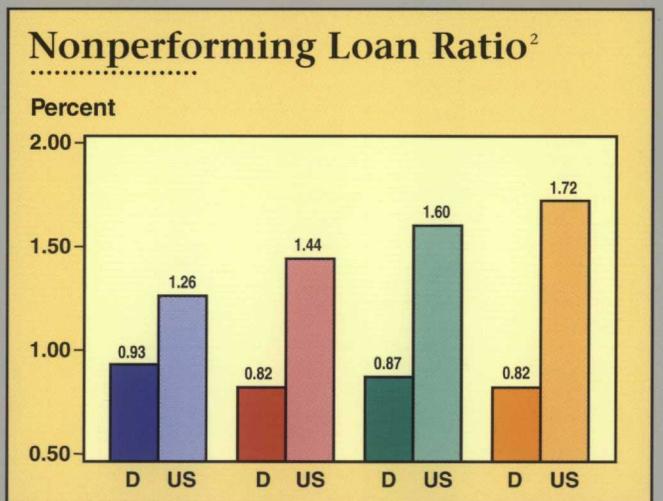
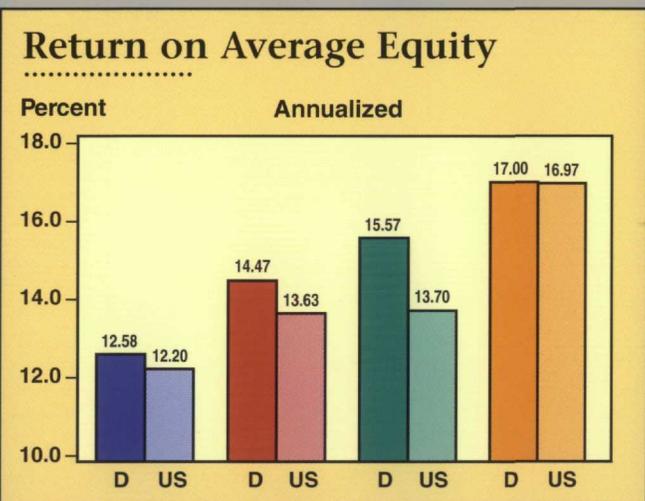
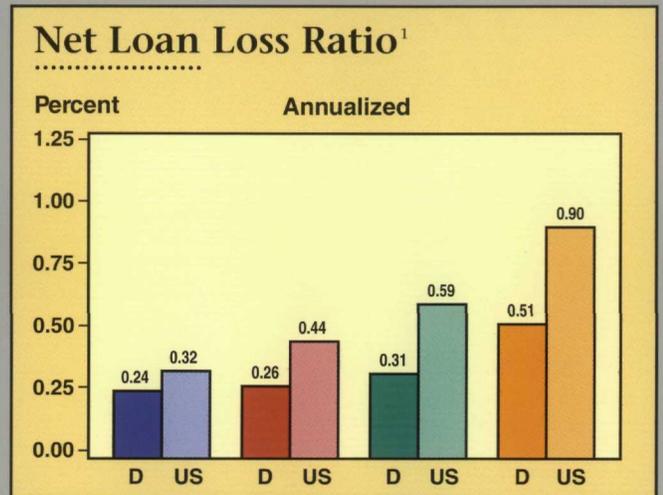
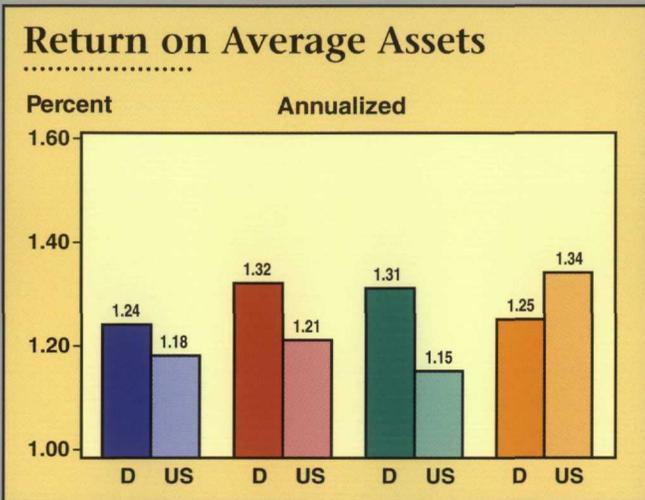
Commercial Bank Performance Ratios

by Asset Size

4th Quarter 1993

Earnings

Asset Quality



D = District
US = United States



NOTE: Asset quality ratios are calculated as a percent of total loans.

¹ Loan losses are adjusted for recoveries

² Includes loans 90 days or more past due and nonaccrual loans

³ Interest income less interest expense as a percent of average earning assets

SOURCE: FFIEC Reports of Condition and Income for Insured Commercial Banks

Agricultural Bank Performance Ratios

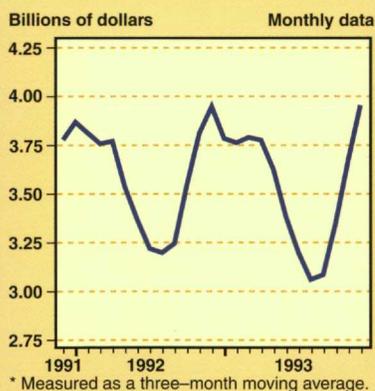
	U.S.	AR	IL	IN	KY	MS	MO	TN
Return on average assets (annualized)								
4th quarter 1993	1.27%	1.29%	1.23%	1.20%	1.25%	1.48%	1.33%	1.02%
3rd quarter 1993	1.35	1.36	1.30	1.25	1.34	1.63	1.42	1.27
4th quarter 1992	1.24	1.38	1.10	1.17	1.28	1.35	1.30	1.13
Return on average equity (annualized)								
4th quarter 1993	12.80%	12.37%	12.00%	12.01%	12.83%	14.22%	13.60%	9.51%
3rd quarter 1993	13.62	13.10	12.70	12.82	13.98	16.41	14.65	12.78
4th quarter 1992	12.98	13.55	11.28	11.96	13.62	13.98	13.84	10.58
Net interest margin (annualized)								
4th quarter 1993	4.60%	4.44%	4.24%	4.76%	4.47%	5.25%	4.61%	4.49%
3rd quarter 1993	4.62	4.41	4.23	4.79	4.49	5.19	4.63	4.66
4th quarter 1992	4.64	4.62	4.24	4.65	4.55	5.18	4.66	4.74
Ag loan losses ÷ average ag loans (annualized)								
4th quarter 1993	0.19%	0.29%	0.17%	-0.23%	0.30%	1.04%	0.43%	0.11%
3rd quarter 1993	0.15	0.41	0.13	0.46	0.15	0.79	0.36	-0.06
4th quarter 1992	0.29	0.49	0.16	0.13	0.31	1.60	0.50	0.65
Ag nonperforming loans¹ ÷ total ag loans								
4th quarter 1993	1.30%	0.79%	1.87%	1.03%	1.25%	3.24%	0.71%	0.00%
3rd quarter 1993	1.54	0.74	1.98	1.36	1.44	2.44	1.02	0.12
4th quarter 1992	1.62	1.10	2.44	2.49	1.95	5.37	1.71	1.48

NOTE: Agricultural banks are defined as those banks with a greater than average share of agricultural loans to total loans.
Data include only that portion of the state within Eighth District boundaries.

¹ Includes loans 90 days or more past due and nonaccrual loans

SOURCE: FFIEC Reports of Condition and Income for Insured Commercial Banks

U.S. Agricultural Exports*



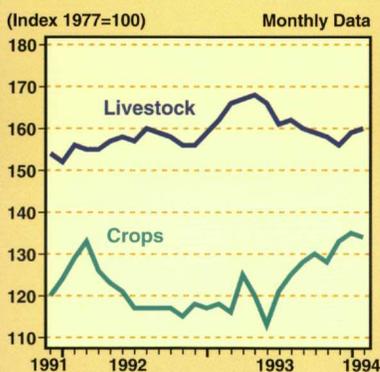
U.S. Agricultural Exports by Commodity

Dollar amounts in billions

Commodity	Oct	Nov	Dec	Year-to-date	Change from year ago
Livestock & products	.67	.72	.73	7.63	-16.2%
Corn	.41	.41	.44	4.22	-10.4
Cotton	.10	.12	.17	1.54	-23.4
Rice	.08	.06	.07	0.77	6.2
Soybeans	.49	.48	.52	4.60	4.8
Tobacco	.08	.11	.13	1.31	-20.9
Wheat	.35	.40	.43	4.66	4.8
TOTAL ¹	3.87	3.90	4.08	42.61	-0.7

¹ Includes commodities not listed here

U.S. Crop and Livestock Prices



Indexes of Food and Agricultural Prices

	Level			Growth ¹	
	IV/93	III/93	IV/92	III/93-IV/93	IV/92-IV/93
Prices received by U.S. farmers	145	143	137	3.78	5.60
Prices received by District farmers ²					
Arkansas	129	123	120	23.57	8.08
Illinois ³	104	102	94	8.05	10.60
Indiana	116	114	102	5.98	13.77
Missouri	136	141	131	-11.77	4.07
Tennessee	141	145	137	-12.24	2.43
Prices paid by U.S. farmers					
Production items	181	179	176	4.54	2.84
Other items ⁴	196	195	192	2.07	2.08
Consumer food prices	143	141	139	4.51	2.66
Consumer nonfood prices	146	145	143	2.78	2.76

NOTE: Data not seasonally adjusted except for consumer food prices and nonfood prices.

¹ Compounded annual rates of change are computed from unrounded data.

² Index of prices received for all farm products (1977=100). Indexes for Kentucky and Mississippi are unavailable.

³ (1985-89=100) for 1991; (1986-90=100) for 1992

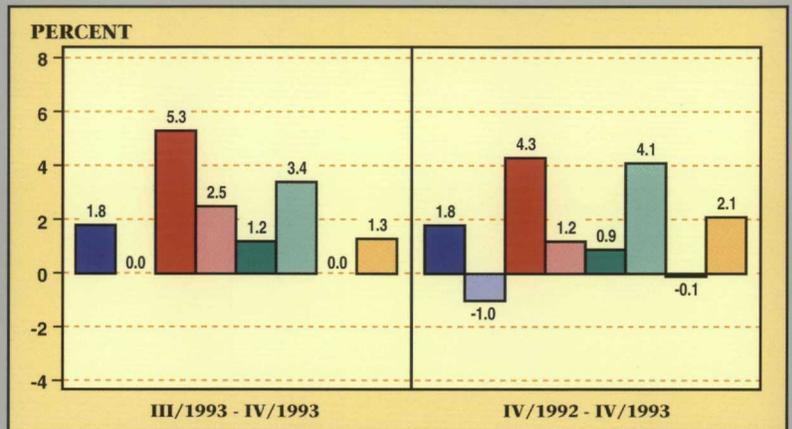
⁴ Other items include commodities, services, interest, taxes and wages.

Selected U.S. and State Business Indicators

United States

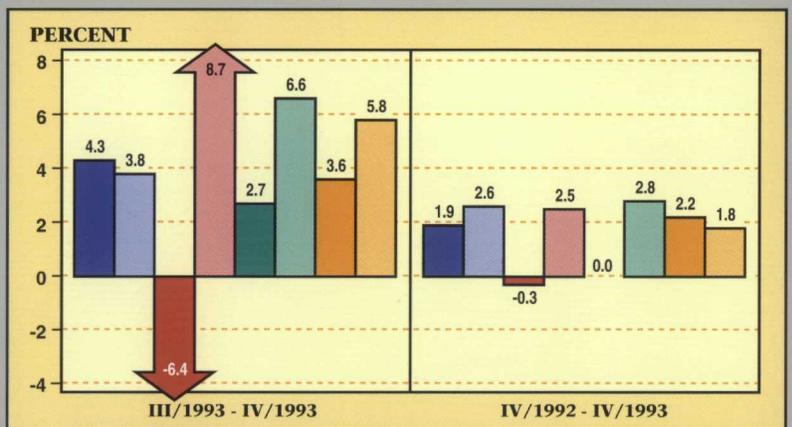
	IV/1993	III/1993	IV/1992
Labor force (in thousands)	128,713	128,181	127,230
Total nonagricultural employment (in thousands)	110,885	110,382	108,930
Unemployment rate	6.5%	6.7%	7.3%
III/1993 II/1993 III/1992			
Real personal income* (in billions)	\$3,726.4	\$3,717.1	\$3,637.1

Compounded Annual Rates of Change in Nonagricultural Employment



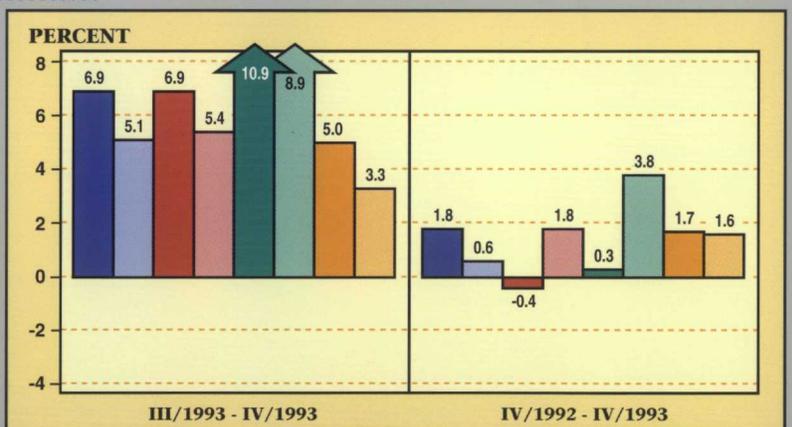
Arkansas

	IV/1993	III/1993	IV/1992
Labor force (in thousands)	1,166.5	1,175.3	1,126.7
Total nonagricultural employment (in thousands)	990.8	980.5	972.6
Unemployment rate	6.3%	5.9%	7.4%
III/1993 II/1993 III/1992			
Real personal income* (in billions)	\$27.2	\$27.5	\$26.7



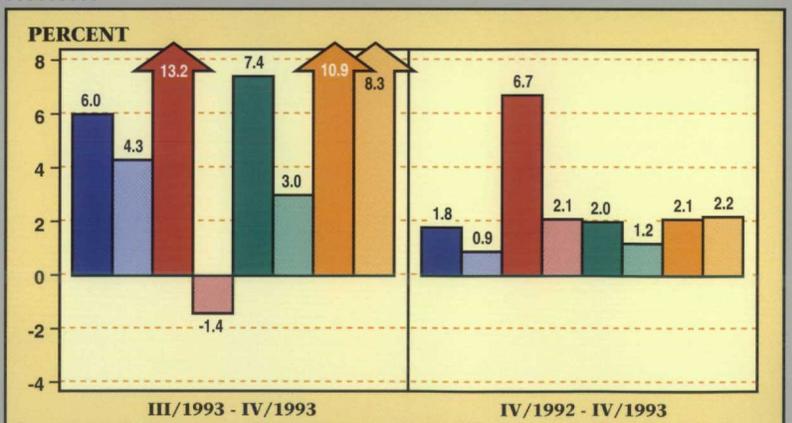
Illinois

	IV/1993	III/1993	IV/1992
Labor force (in thousands)	6,099.9	6,117.4	6,138.9
Total nonagricultural employment (in thousands)	5,315.5	5,228.2	5,224.1
Unemployment rate	6.2%	7.7%	6.3%
III/1993 II/1993 III/1992			
Real personal income* (in billions)	\$184.6	\$184.8	\$181.8



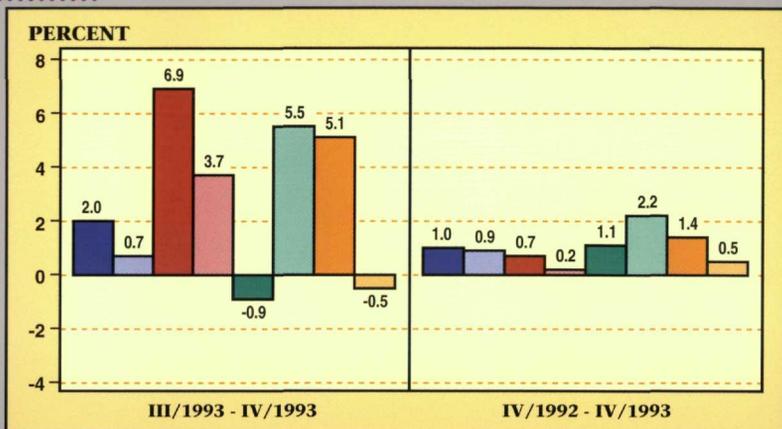
Indiana

	IV/1993	III/1993	IV/1992
Labor force (in thousands)	2,993.7	2,999.2	2,824.0
Total nonagricultural employment (in thousands)	2,598.3	2,560.8	2,551.9
Unemployment rate	4.7%	4.4%	6.4%
III/1993 II/1993 III/1992			
Real personal income* (in billions)	\$76.6	\$76.0	\$74.2



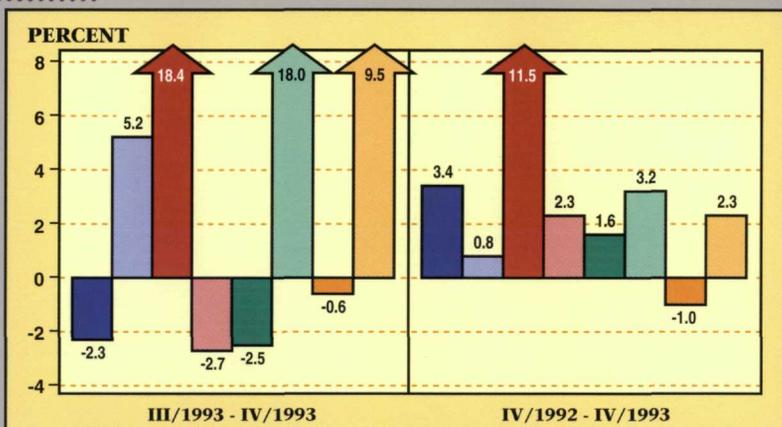
Kentucky

	IV/1993	III/1993	IV/1992
Labor force (in thousands)	1,749.2	1,774.5	1,758.2
Total nonagricultural employment (in thousands)	1,537.2	1,529.7	1,522.2
Unemployment rate	6.2%	6.7%	6.8%
	III/1993	II/1993	III/1992
Real personal income* (in billions)	\$46.3	\$45.9	\$45.0



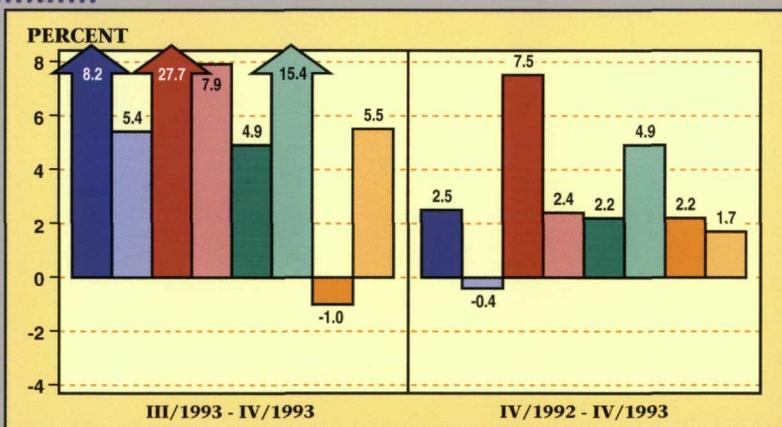
Mississippi

	IV/1993	III/1993	IV/1992
Labor force (in thousands)	1,210.7	1,200.6	1,182.4
Total nonagricultural employment (in thousands)	1,029.0	1,035.2	995.0
Unemployment rate	5.5%	5.7%	7.0%
	III/1993	II/1993	III/1992
Real personal income* (in billions)	\$27.2	\$27.1	\$26.2



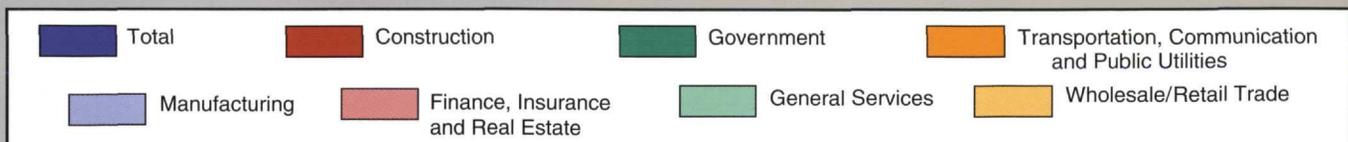
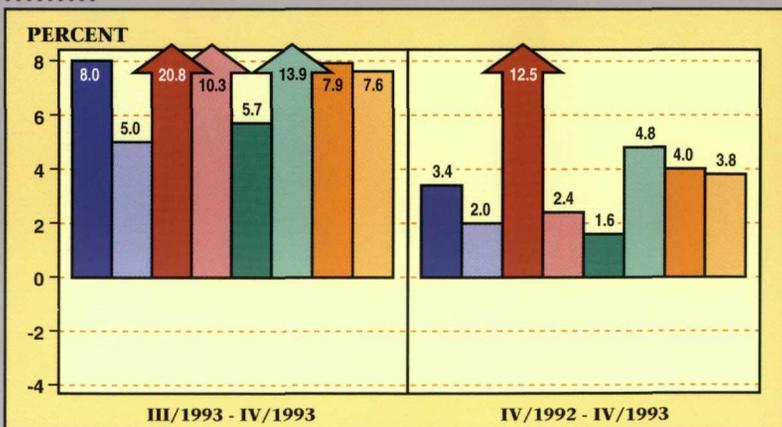
Missouri

	IV/1993	III/1993	IV/1992
Labor force (in thousands)	2,709.3	2,699.1	2,676.8
Total nonagricultural employment (in thousands)	2,379.6	2,333.1	2,321.4
Unemployment rate	5.9%	5.9%	5.2%
	III/1993	II/1993	III/1992
Real personal income* (in billions)	\$70.1	\$71.5	\$70.1



Tennessee

	IV/1993	III/1993	IV/1992
Labor force (in thousands)	2,511.2	2,479.4	2,468.4
Total nonagricultural employment (in thousands)	2,317.0	2,273.0	2,241.6
Unemployment rate	4.9%	5.6%	5.9%
	III/1993	II/1993	III/1992
Real personal income* (in billions)	\$65.4	\$64.9	\$62.9



NOTE: All data are seasonally adjusted. The nonagricultural employment data reflect the 1992 benchmark revision.
* Annual rate. Data deflated by CPI, 1982-84=100.