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# Rural Conditions and Trends

1999, Volume 9, Number 3

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## A Combination of Longrun Forces and Short-Term Macroeconomic Fluctuations Are Shaping Rural Industry

*Several sectors important to the rural economy—agriculture, mining, and manufacturing—showed signs of weakness in 1998. At the same time, the growing importance of technology and a skilled labor force to U.S. industry has important implications for the structure of the rural economy, which has traditionally relied on agriculture, other extractive industries, and low-skill manufacturing. Deregulation of industry raises concerns about rural service, but safeguards have been put in place to protect rural businesses and consumers.*

The U.S. economy continued to grow in 1998, but several sectors that are important to the rural economy—agriculture, mining, and manufacturing—have shown signs of weakness. Abundant world supplies and weak foreign demand have pushed down prices for many farm commodities. Financial crises in Asia, Russia, and Latin America have also softened demand for manufactured goods, minerals, and energy. Competition from Asian countries recovering from financial crisis is a concern for U.S. manufacturers. Strong consumer confidence and domestic demand should sustain growth in the U.S. economy in 1999. However, nonmetro growth may be slower, due to weakness in the agricultural, mining, and manufacturing sectors, which together account for one-fourth of nonmetro jobs.

### Importance of Worker Skill Is Growing

This Rural Industry issue of *Rural Conditions and Trends* also reports on two longer term trends that have important implications for the rural economy: the increasing demand for skilled versus unskilled workers and deregulation of the transportation, banking, and electricity generation/distribution industries. Projections by the Bureau of Labor Statistics (BLS) indicate that the U.S. economy will continue to add skilled workers in the coming decade. Most new jobs will require post-high school training, and most will be in health, professional, social, and business service industries, which tend to be located in urban areas. Demand for agricultural, manufacturing, and mining output is expected to rise, but productivity gains will result in decreasing demand for workers in these industries.

The divergence in job opportunities and incomes for skilled and unskilled workers has been the subject of considerable debate in the public policy arena over the past decade. Some commentators have attributed this phenomenon to competition from low-wage imports. A recent study by ERS concludes that exported goods and services are somewhat more skill-intensive than those displaced by imports. Over time, however, most U.S. job growth has been due to growing domestic demand. Jobs created by domestic demand are also much higher in skill than either those created by exports or those displaced by imports. Jobs related to exports and imports have grown much more slowly, and in roughly offsetting fashion.

Looking at the involvement of individual firms in export markets gives a different perspective. Nearly half of rural manufacturers have export sales, and those that export perform relatively well on several measures of competitiveness compared with those that do not export. Exporting firms also report more rapid increases in worker skill demands, and exporters are doing more to upgrade their employees' skills.

Labor quality problems have been a common complaint of employers, both rural and urban, in recent years. In an ERS study of manufacturing competitiveness, local labor quality emerged as the most commonly cited problem by both rural and urban manufacturers. Both demand (new technology and increasing skill demands) and supply (problems associated with low education levels) factors contribute to labor quality problems, but no single factor emerges as the key. It seems clear, however, that rural areas face considerable challenges in supplying workers with the requisite skills and work attitude needed by increasingly sophisticated manufacturing businesses.

The challenge of developing a technologically sophisticated industry and a skilled work force appears to be worthwhile. Use of advanced technology and management practices is associated with substantially higher wages and provision of benefits, which may help offset the negative effects of declining unionization on worker earnings and benefits.

Technology-intensive firms are more inclined to offer profit-sharing plans for workers, which gives employees a greater stake in the success of the company.

### **Deregulation Raises Concerns for Rural Businesses and Consumers**

This issue also reports on several industries that are in various stages of deregulation: transportation, electricity, and banking. Deregulation is believed to increase the efficiency of the economy and provide benefits to consumers. However, rural areas are concerned about being left behind. Since rural markets are often not large enough to justify the costs of serving them, businesses may avoid rural markets in a deregulated environment. When service is offered, it may be at a higher price, with fewer choices than are available to urban customers. Reliability of service in the absence of regulation becomes an issue as well, as illustrated by the transportation bottlenecks and electricity rate spikes of 1998.

In the transportation industry, the big news in 1998 was the Transportation Equity Act for the 21st Century, which provides sharp increases in highway and transit program funding over the next 6 years. The increase varies across States, but averages a generous 44 percent. Increased highway construction may facilitate industrial development in less-accessible Western and Appalachian communities, but there is some concern that funding for enforcement of environmental regulations has diverted resources from rural roads and bridges. Funding for rural transit could have important effects by addressing the mismatch between the location of jobs and potential workers in rural areas and by improving access to shopping and services for rural residents. Funding for passenger rail and rural air service was also boosted in 1998. Also in 1998, consolidation of the rail freight industry continued with the purchase of Conrail by Norfolk Southern and CSX.

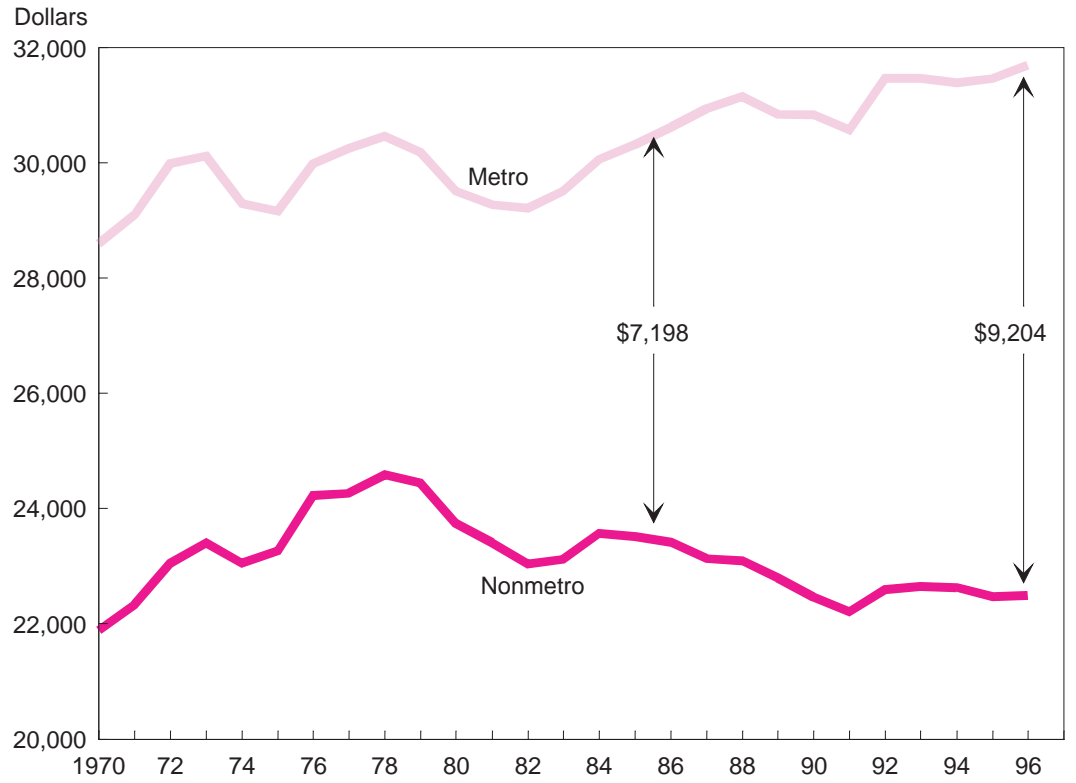
Deregulation of the electric utility industry has been a high-profile issue. While Congress considers several alternative approaches, most States have already deregulated or are considering it. A number of sticky issues must be resolved before national deregulation can occur. Rural customers are not likely to benefit as much as urban customers, and could face higher electric rates, because rural locations are more costly to service.

The structure of the U.S. banking industry has been changing dramatically over the past two decades, and further change is expected. Consolidation of banks raises concern about the lack of competition and community service in rural markets. However, Federal antitrust guidelines generally prohibit most mergers of banks in small rural communities, and urban banks are very active in rural communities. Financial services deregulation has in some cases spurred rural job creation by allowing credit card operations to locate in rural States.

### **Rural Growth Slowing, Earnings Falling Behind**

This issue also provides the most recent data (1996) on nonmetro employment, earnings, farm- and farm-related employment, food and fiber system employment, and activity triggered by agricultural trade. Nonmetro job growth slowed to 1.5 percent in 1995-96 after averaging 2.3 percent during the prior 4 years. Metro job growth was 2.1 percent during 1995-96. Real nonmetro earnings per nonfarm job fell further behind metro, growing only 0.1 percent in 1996 (fig. 1). The gap between metro and nonmetro earnings per nonfarm job grew to \$9,204 in 1996, the largest gap measured since the data series began in 1969. [Fred Gale, 202-694-5349, fgale@econ.ag.gov]

Figure 1  
**Real nonfarm earnings per job, metro and nonmetro counties, 1970-96**  
*The gap between metro and nonmetro earnings has widened over the past decade*



Source: Calculated by ERS using data from Bureau of Economic Analysis.

## Global Conditions Hurting Rural Economy

*Although the U.S. economy continues to grow, global economic conditions have adversely affected U.S. mining, manufacturing, and agriculture. The confluence of abundant supplies, the appreciation of the U.S. dollar, and weak demand from Asia and elsewhere have resulted in low agricultural prices. Slow world growth and low farm prices have softened the rural economy.*

**F**or the last 4 years of the current economic expansion, nonmetro employment has been growing more slowly than metro employment. Employment growth in nonmetro areas was sluggish in 1998. The Current Population Survey and Local Area Unemployment Statistics data as of the third quarter 1998 both show stagnant nonmetro employment growth. While the United States is expected to avoid recession in 1999, weaknesses in agriculture, mining, and manufacturing are likely to induce continued softness in nonmetro area employment.

### Asia Crisis Has Spread

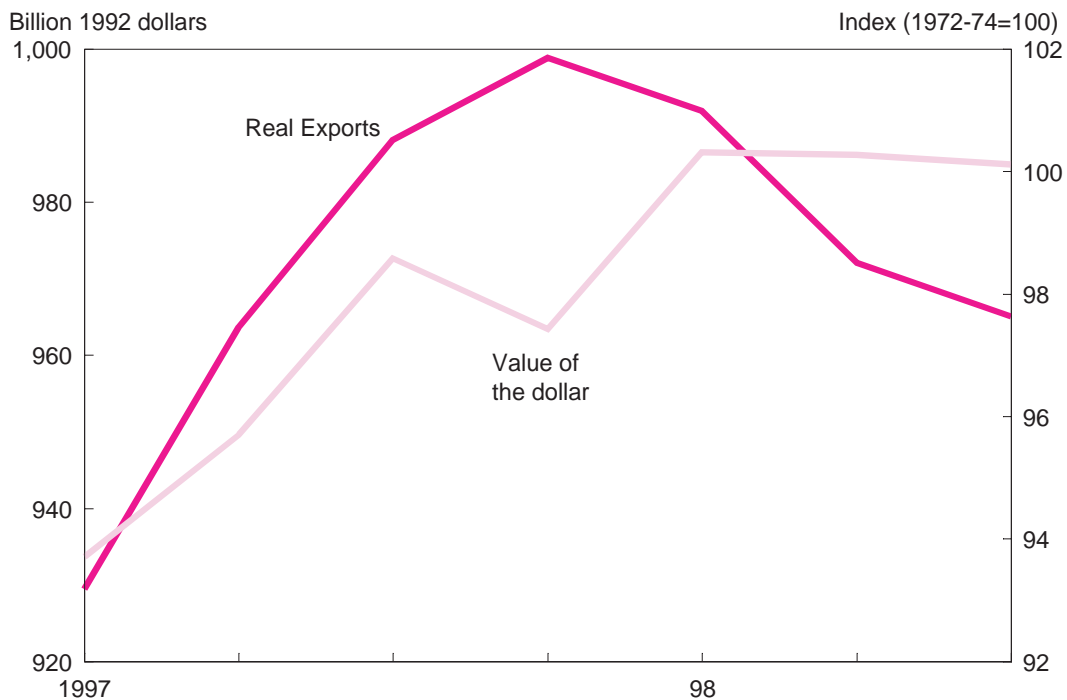
What began solely as a run on the Thai stock and currency markets turned into an Asian financial crisis severe enough to pull Japan into recession. The spillover of this crisis lowered equity prices around the world. The search for safe investments bid up the price of U.S. bonds and the dollar. The Treasury bond yield, which is inversely related to bond price, fell 1 percentage point to the lowest level since 30-year bonds were first issued in 1977. The world growth slowdown, a strong dollar, and jittery financial markets provided an unfavorable environment for U.S. goods exports (fig. 1). In particular, exports and prices in mining and manufacturing were hit hard.

Three factors contributed to low U.S. agricultural prices. Large crop harvests worldwide were the primary factor, and would have reduced world crop prices even without the global economic crisis. On the demand side, domestic prices fell further as the strong U.S. dollar converted the reduced world prices into lower U.S. prices. In addition, weaker

Figure 1

### Real exports and Federal Reserve Board trade-weighted value of U.S. dollar, 1997-98

*Real exports declined while the dollar stayed strong*



Source: National Income and Product Accounts, Bureau of Economic Analysis, and Federal Reserve Board of Governors.

world growth and the stronger dollar cut demand for U.S. agricultural exports. This softened demand translated into more downward pressure on U.S. agricultural prices.

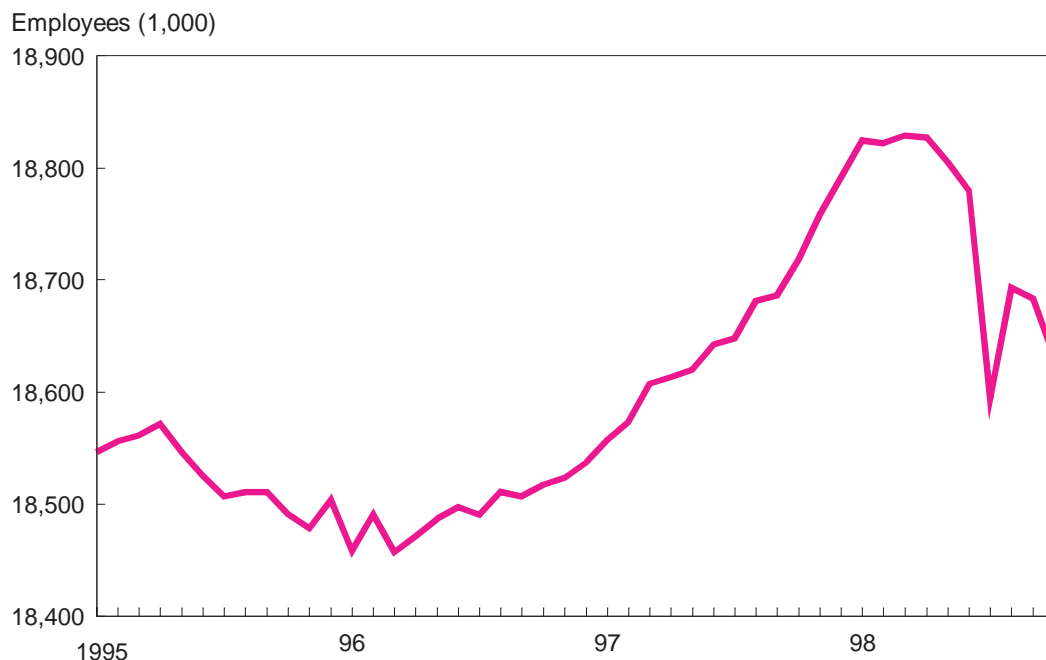
The concerns about the spillover of the world financial crisis on the U.S. economy became serious enough that in August the Federal Reserve Board (Fed) changed its monetary policy by cutting short-term interest rates. In September, October, and again in November, the Fed cut the Federal Funds rate, the rate banks charge each other to cover reserve requirements. In response to the lower Federal Funds rate and declining long-term Treasury bond yields, banks reduced lending rates.

The effects on U.S. business were most apparent in the internationally exposed sectors. The real trade deficit widened \$120 billion between the third quarter of 1997 and the third quarter of 1998. The decline in manufacturing output throughout the first three quarters of 1998 was due to both import substitution and declining exports of manufactured goods, as well as the General Motors (GM) strike. Mining, including crude oil extraction, also faced weak export demand resulting in low prices. Although crude oil prices mildly recovered in the summer, they declined sharply in the fall.

U.S. durable goods output rose moderately for the first three quarters of 1998 compared with 1997, despite the GM strike. Nondurable goods output grew modestly in the same period as did real wages in manufacturing. Wall Street estimates of manufacturing profits as a whole fell in the third quarter of 1998, reflecting declining profit margins due largely to lower export prices and higher wages. In the third quarter, weak demand for manufactured goods led to a modest decline in manufacturing employment, which would have been larger had many workers not been returning at the end of the GM strike (fig. 2). However, employment continued to expand in other sectors of the economy.

Apart from a moderate increase in credit standards for large businesses in the latter half of 1998 and a modest stock market correction triggered by the contagion of the bad news

Figure 2  
**U.S. manufacturing employment, 1995-98**  
*Weak demand led to declining manufacturing employment in the third quarter of 1998, despite the bounce-back from the GM strike*



Note: Data are seasonally adjusted.  
 Source: Bureau of Labor Statistics.

from Russia, Asia, and Latin America, domestic demand continued to grow. Consumer demand in 1998 was strong as rising real wages spurred higher personal income. Consumer credit was readily available, and saving rates dropped. In addition, low long-term interest rates, resulting from lower Treasury bond yields, allowed many consumers to refinance mortgages. This increasing cash flow spurred higher consumer spending. Lower stock prices were only a modest drag on consumer spending. New housing starts grew due to high personal income and low interest rates. Strong profits of nonfinancial businesses in the first half boosted business plant and equipment spending. Low inflation, due to falling raw material and energy prices, further boosted growth. Low input prices contributed to strong labor productivity growth, especially in the first half of 1998. For the year, inflation was estimated at below 1.5 percent, and GDP grew an estimated 3.4 percent, despite a rising trade deficit.

### Prospects for 1999 Are for a Moderating U.S. Economy

Consumer spending is expected to be strong in 1999, due to continued rising real wages. Investment spending growth will likely moderate from the fast pace of early 1998. Low interest rates, available credit, and good business prospects will fuel plant and equipment spending. The trade deficit will be larger, due to the continued strength of the dollar and sluggish world growth. Despite the world growth slowdown, Canadian and European growth are expected to be moderate. Inflation is expected to be only slightly higher, about 2 percent, as commodity prices stabilize and real wage growth slows. Employment growth will slow as productivity growth rises, resulting in strong GDP growth.

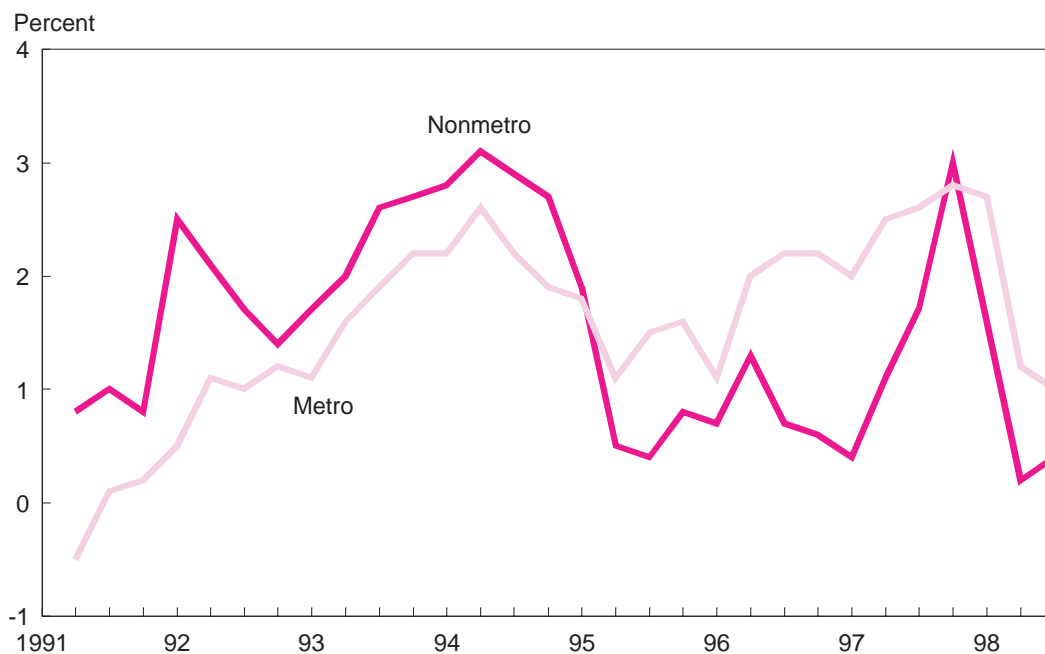
### Asian Crisis Hurts Nonmetro Areas

This economic expansion has been marked by three phases for nonmetro areas. First, during the recovery years of 1991-94, rural economies showed strong economic performance and outperformed metro areas by several measures. Second, since 1995, however, nonmetro growth slowed while metro growth picked up (fig. 3). This slowdown coincided with a slower rate of net immigration of population to nonmetro areas. The population

Figure 3

#### Nonmetro and metro employment growth, 1991-98

*Nonmetro employment growth has fallen behind metro growth since 1995*



Source: Calculated by ERS using Local Area Unemployment Statistics from the Bureau of Labor Statistics.



movement to nonmetro areas slowed as job creation slowed. Third, in 1998, the crisis in developing economies and abundant world stocks of agricultural commodities affected three U.S. industries: agriculture, mining, and manufacturing. U.S. exports have sharply dropped in these industries. These industries provided 26 percent of nonmetro jobs and only 14 percent of metro jobs in 1996. (See appendix table 1—Nonfarm jobs by industry and BEA region, 1996.)

The slowdown in world economic growth affected the nonmetro labor market. In the third quarter of 1998, the nonmetro unemployment rate increased to 4.9 percent while the metro rate stayed essentially the same throughout the first three quarters, averaging 4.5 percent. This divergence of the two unemployment rates is important in that the two rates have been about the same for the last several years. The two employment data sources showed negligible movement in the number of nonmetro jobs over the first three quarters of 1998.

Another factor contributing to the softness in the nonmetro employment situation is the longrun trend toward fewer mining and Federal Government jobs. Mining has been shrinking in employment since 1981 due to productivity increases and increased low-cost energy imports. Federal Government employment has shrunk due to downsizing and military base closings. Although these two industries together provide only 1.1 million nonmetro jobs out of a total 25.4 million in 1996, this employment tends to be highly paid and geographically concentrated and so is important in rural areas.

### **Nonmetro Prospects**

Most macroeconomic analysts expect continued strong U.S. GDP growth in 1999. The East Asian recovery is moving faster than had been expected. Still, the U.S. trade deficit is expected to widen. Employment growth in nonmetro areas is likely to be weak over the next year due to an increasing trade deficit. *[Data as of 11/20/98. David Torgerson, 202-694-5443, dtorg@econ.ag.gov, and Karen S. Hamrick, 202-694-5426, khamrick@econ.ag.gov]*

## Future Job Growth Will Benefit Educated Workers Most

*Nonmetro areas have disproportionately more workers in industries and occupations with projected slow or negative growth by 2006. However, a large share of nonmetro workers are in sectors and occupational groups that are expected to grow at least moderately.*

**J**obs in most occupational groups and industries are expected to grow between 1996 and 2006, according to projections released by the Bureau of Labor Statistics (BLS). The largest gains are expected to be in the services industry and the fastest growing occupations are those that require at least an associate's degree. Although BLS does not forecast separate employment trends for metro and nonmetro areas, the BLS projections can provide some indications of the job picture for rural areas. Nonmetro areas have disproportionately more workers in industries and occupations with projected slow or negative growth. However, a large share of nonmetro workers are in sectors and occupational groups that are expected to grow at least moderately. Nonmetro areas have a smaller share of workers in the occupations projected to grow the fastest—those requiring higher levels of education. In addition to net employment growth, BLS projects that jobs will become open at all levels of training and education due to replacement needs.

### Services Industry Will Continue Rapid Expansion

By 2006, BLS projects that 18.6 million jobs will be created, bringing the number of U.S. jobs to 151 million. A look at jobs by *industry* indicates that nearly all of the expected new jobs will be in the services industry, with large growth projected in health services; business services, including personnel supply services (temporary help services); social services, including residential care and child care; and engineering, management, and related services. These four industries together are expected to produce half the new jobs in the economy by 2006.

Agriculture, forestry, and fishing, still an important employer in some nonmetro areas, is expected to have stable employment—only a 1-percent decline in jobs is projected. However, BLS projects production agriculture to lose 253,000 jobs, 11 percent, by 2006. This employment decline is due to continued technological improvements. Despite employment losses, real output in production agriculture is expected to increase 1.5 percent annually as a result of improvements in agricultural productivity. Agricultural services, however, are expected to add 240,000 jobs (18 percent) by 2006, with strong gains in landscaping and horticultural services.

This projected change in the composition of agricultural, forestry, and fishing employment continues the trend seen since 1986. Between 1986 and 1996, employment in production agriculture declined by 6 percent (147,000 jobs), while agricultural services, including landscaping and horticultural services, increased by almost 60 percent (490,000 jobs). The net result, including a loss of 29,000 jobs in forestry, fishing, hunting, and trapping, was about a 10-percent increase in employment in the agriculture, forestry, and fishing industry.

Mining is expected to decline by almost one-quarter to only 443,000 jobs due to productivity gains and increased reliance on foreign oil. Although mining employs relatively few workers in the U.S. labor force, it is an important employer in some regions of the United States, especially in the rural West, because it provides high-wage jobs.

Construction jobs are expected to increase due primarily to public investment in infrastructure, with growth in residential construction softening from slowing population growth. Manufacturing is expected to show strong output growth and productivity gains, but continued declining employment. Despite a projected growth of 2.4 percent annually in real manufacturing output, jobs are expected to decline by 350,000. Although employment in the Federal Government is expected to decline, overall public sector employment is expected to increase. Most of the increase is in education jobs in response to the growing school-age population.

A large share of nonmetro workers are employed in industries expected to grow by 2006. Among the projected growth industries, nonmetro areas have about the same proportion of

employment as do metro areas, except for the services industry. In 1996, only 23 percent of nonmetro jobs were in services compared with 32 percent of metro jobs (table 1). However, nonmetro areas currently have disproportionately more workers in the three industries expected to see job losses—agriculture, forestry, and fishing; mining; and manufacturing. Manufacturing in particular is an important employer in rural areas, accounting for 16 percent of total nonmetro employment. The two slow-growing industries, construction and government, are also disproportionately nonmetro.

Table 1

**Industry and occupation employment**

*Employment to shrink by 2006 in agriculture, forestry, and fishing industry, but to grow slowly in the agriculture, forestry, and fishing occupations*

Industry and occupation	Share of total employment, 1996		National job growth/decline	
	Nonmetro	Metro	1986-96	1996-2006*
<i>Industry:</i>			Percent	
Agriculture, forestry, fishing**	9	2	10	-1
Mining	1	***	-26	-23
Construction	6	5	12	9
Manufacturing	16	12	-3	-2
Transportation, communications, utilities	4	5	19	14
Wholesale trade	3	5	13	12
Retail trade	17	17	21	10
Finance, insurance, and real estate	5	8	10	11
Services	23	32	50	33
Government	16	14	16	9
Total employment	100	100	19	14
<i>Occupation:</i>				
Executive, administrative, and managerial	10	15	28	17
Professional specialty	11	16	34	27
Technicians and related support	3	3	24	20
Marketing and sales	10	13	27	16
Administrative support occupations, including clerical	12	15	15	8
Service occupations	14	13	22	18
Agriculture, forestry, fishing, and related occupations	7	2	3	1
Precision production, craft, and repair	13	10	4	7
Operators, fabricators, and laborers	20	13	10	8
Total employment	100	100	19	14

\*Projected; assumes GDP annual growth of 2.1 percent. \*\* Includes farm and agricultural service industries.

\*\*\* Less than 0.5 percent.

Source: Calculated by ERS using Bureau of Economic Analysis, U.S. Department of Commerce data and Current Population Survey data; projections from Bureau of Labor Statistics, U.S. Department of Labor, *Monthly Labor Review*, November 1997.

### Occupational Growth Will Be Strongest in Professional Specialty and Service Occupations

Projections also indicate that U.S. employment in all major *occupational groups* is expected to increase. BLS projects that professional specialty occupations, which have high educational attainment requirements, and service occupations, which have low-skill requirements, will generate half of the total job growth. Among professional specialty occupations, the largest gains are expected for teachers, librarians, and counselors; for computer, mathematical, and operations research occupations; and for health assessment and treatment occupations. Employment in service occupations is expected to be mainly in food preparation and service, cleaning and building service, protective service, and personal service (such as hairdressers, home health aides, and child care workers).

The other occupational groups with expected above-average growth are executive, administrative, and managerial and marketing and sales. Although management jobs are projected to increase, it will be at a slower rate than during 1986-96 primarily due to the reduced use of middle-level managers. The increase in marketing and sales jobs is linked to the expected increases in employment in the wholesale and retail trade industries.

Employment in the two occupational groups—precision production, craft, and repair and operators, fabricators and laborers—associated with the manufacturing and construction industries, is expected to increase but at a lower-than-average rate. Gains are expected among mechanics, installers, and repairers; construction trades workers; blue-collar worker supervisors; plant and system occupations; transportation and material moving machine and vehicle operators; and helpers, laborers, and material movers. Along with the projected decline in employment in the manufacturing industry is a projected decline of 38,000 jobs in precision production occupations.

The agriculture, forestry, fishing, and related occupational group is expected to grow by 37,000 jobs. Although job losses are expected for farm operators and managers, especially self-employed farmers, and for farmworkers, these losses will be more than matched by gains in gardening, nursery, and greenhouse/lawnservice occupations. The higher growth rates of other occupational groups, however, will mean that agriculture, forestry, and fishing occupations' share of total employment will decline to 2.5 percent in 2006—down from 2.9 percent in 1996 and 3.3 percent in 1986—making this occupational group the smallest in the economy.

Rural areas have a larger share of workers employed in occupational groups expected to have the least employment growth—agriculture, forestry, fishing, and related occupations;

#### Classifying by Industry and Occupation

The Bureau of Labor Statistics classifies jobs in two ways. An *industry* classification identifies the sector that employs a worker, while *occupation* designates a type of job. For example, the agriculture, forestry, and fishing industry includes crop production; livestock production; agricultural services (for example, crop services, veterinary services, farm labor and management, and landscaping); forestry; and fishing, hunting, and trapping. Agriculture, forestry, fishing, and related occupations include animal breeding and training; animal care; veterinary assistance; farm work; farm operation and management; farming and forestry supervision; forestry and logging; gardening, nursery, and greenhouse/lawnservice occupations; gardening and groundskeeping; and fishing, hunting, and trapping.

For any given job, the industry designation does not necessarily coincide with the occupation classification. A worker in an agricultural occupation may actually work outside the agricultural industry, while a worker in a nonagricultural occupation may work in the agricultural industry. For example, an accountant—an occupation classified as executive, administrative, and managerial—who works for a farm operation would be classified in the agricultural industry. Along the same lines, a farmworker—an agricultural occupation—employed on a farm is in the agricultural industry, while a groundskeeper—also an agricultural occupation—employed by an automaker is classified as part of the manufacturing industry.

precision production, craft, and repair occupations; and operators, fabricators, and laborers. The only slow-growing occupational category that currently has a larger share of metro than nonmetro workers is administrative support, including clerical occupations.

The five occupations expected to generate the most new jobs by 2006 are cashiers, systems analysts, general managers and top executives, registered nurses, and retail salespersons. These five occupations together account for about 6 percent of nonmetro employment versus a metro share of 8 percent. The five occupations expected to lose the most jobs are sewing machine operators, garment; farmers; bookkeeping, accounting, and auditing clerks; typists and word processors; and secretaries, except for legal and medical secretaries. About 6 percent of nonmetro workers are in these jobs versus 5 percent of metro workers. These declines are due to technological advances, organizational changes, or factors other than industry employment declines.

**Slower Growth in Low-Skill Occupations**

Average employment growth is expected to be fastest in occupations requiring at least an associate's degree (table 2). Occupations requiring only short-term on-the-job training (up to 1 month) are the largest education and training category, currently comprising about one-third of all jobs. Employment in these occupations is projected to grow slightly less than average, 13 percent during 1996-2006. This category primarily includes operators, fabricators, and laborer occupations, and administrative support occupations, including clerical. Of the five occupations expected to generate the most new jobs by 2006, discussed above, three require at least an associate's degree, whereas cashier and retail salesperson jobs require only short-term on-the-job training.

Table 2

**Education and training category employment**

*The fastest growing occupations are those requiring an associate's degree or higher*

Education and training categories	Share of employment, 1996		National job growth, 1996-2006
	Nonmetro	Metro	
	Percent		
First professional degree	1	2	18
Doctoral degree	1	1	19
Master's degree	1	1	15
Work experience plus bachelor's or higher degree	7	10	18
Bachelor's degree	10	15	25
Associate's degree	2	3	22
Postsecondary vocational training	7	7	7
Work experience in a related occupation	12	10	12
Long-term on-the-job training	14	9	9
Moderate-term on-the-job training	13	11	9
Short-term on-the-job training	32	31	13
Total employment	100	100	14

Source: Calculated by ERS using 1996 Current Population Survey data; Bureau of Labor Statistics projections, Bureau of Labor Statistics, U.S. Department of Labor, *Monthly Labor Review*, November 1997. Education and training categories from Office of Employment Projections, BLS.

About 22 percent of nonmetro workers have jobs that require an associate's degree or higher versus 32 percent of metro workers. Looking at low-skill occupations—occupations that require either long-term (12 months or more), moderate-term (1-12 months), or short-term (up to 1 month) on-the-job training—60 percent of nonmetro workers are in low-skill jobs, whereas only 51 percent of metro workers would be classified as low-skill. The combination of these three education and training categories is considered low-skill since each is entry-level without formal education or experience requirements. BLS projects that employment will grow 12 percent in the three low-skill categories combined, just slightly less than the projected nationwide 14-percent employment growth.

New jobs will not be the only employment opportunity. In addition to the 18.6 million new jobs expected to be created by 2006, BLS projects that 32 million jobs will become open due to replacement needs, which will be in all occupational groups and at all levels of training and education.

### **Implications for Rural Areas**

Although rural areas did well in generating jobs in the early years of this decade, job growth has softened in the last 4 years. The Asian financial crisis and low U.S. agricultural prices bring additional concern that job growth in rural areas will continue to be slow. The task now facing rural areas is to use their economic advantages, such as lower land and labor costs, to manage the labor market changes over the next decade. *[Karen S. Hamrick, 202-694-5426, khamrick@econ.ag.gov]*

More details on BLS employment growth projections are available on the Internet at <http://stats.bls.gov/emphome.htm>, or in the November 1997 issue of BLS's *Monthly Labor Review*.

### **BLS Growth Projections and Occupational Categories**

BLS projections are based on a group of assumptions about the U.S. macroeconomy that can be characterized as slightly more conservative than the October 1997 Blue Chip consensus long-range projections, the most commonly cited report of the consensus of macroeconomic forecasters. BLS expects real Gross Domestic Product (GDP) to increase 2.1 percent annually from 1996 to 2006, slightly less than the 2.3-percent growth rate achieved in 1986-96. Much of the expected slowdown in GDP growth is due to a slower-growing labor force. Over the next decade, the population distribution will shift to age groups with lower labor force participation, such as the youth labor force (age 16-24) and the labor force age 55 and older. The aging of the baby boom generation is expected to increase the median age of the labor force to 40.6 years old, the highest since 1962.

BLS expects that the foreign trade sector will be the fastest growing component of real GDP and that exports will grow faster than imports, resulting in an improved trade position. (Note, however, that the projections were done before the Asian financial crisis.) BLS assumptions include decreased real Federal spending (both defense and nondefense), a balanced Federal budget by 2006, and a surplus in the combined Federal and State budgets, leading to a downward trend in long-term interest rates.

Gross private investment is expected to increase 3.3 percent annually, faster than GDP growth. Consequently, productivity is expected to grow 1.1 percent per year, an increase over the 0.9-percent annual growth rate seen in 1986-96. In turn, real per capita disposable income is expected to increase by 1.1 percent annually as well.

BLS projects that the Hispanic population will continue to grow faster than the Black population, and by 2006, the Hispanic labor force is expected to increase its share of the total civilian labor force from 10 to 12 percent compared with a steady share of 11 percent for Black workers. Non-Hispanic White workers will make up 73 percent of the workforce, while Asians and other groups are expected to be 5 percent of the total.

BLS projections for occupations by education and training categories are done using categories developed by the Office of Employment Projections, BLS. Each occupation is placed in one category based on its requirements as follows: first professional degree (for example, law, medicine, dentistry, and clergy); doctoral degree; master's degree; work experience plus bachelor's or higher degree (mostly managerial occupations that require experience in a related nonmanagerial occupation); bachelor's degree; associate's degree; postsecondary vocational training (these occupations require a training program and may also require a licensing exam); work experience in a related occupation (some occupations are supervisory or managerial occupations, but also others require skills and experience gained in another occupation, for example police detectives, who are selected based on their experience as police patrol officers); long-term on-the-job training (occupations that usually require more than 12 months of on-the-job training or combined work experience and formal classroom instruction before workers develop the skills needed for average job performance, such as electrician, bricklayer, and machinist that normally require apprenticeships lasting up to 4 years); moderate-term on-the-job training (workers can achieve average job performance after 1 to 12 months of combined job experience and informal training, such as dental assistants, drywall installers and finishers, and machine operators); and short-term on-the-job training (workers usually can achieve average job performance in just a few days or weeks, such as cashier, bank teller, and messenger). For more information on the education and training categories, see U.S. Department of Labor, Bureau of Labor Statistics, "Occupational Projections and Training Data," Bulletin 2501, January 1998.

## Most Jobs Created by Exports Are in Medium- and High-Skill Occupations

*U.S. jobs supported by exports are more concentrated in medium- and high-skill occupations compared with jobs displaced by imports, about half of which are in low-skill occupational categories. Exports also seem to be linked to increasing skill requirements for workers in rural manufacturing businesses. However, analysis of long-term trends in job creation shows that domestic demand generates most high-skill jobs.*

Opponents of free trade argue that imports from low-wage countries lead to job losses for middle class workers. These concerns are receiving increased attention as economic downturns in Asia, Russia, and Latin America and a relatively strong dollar swell the U.S. trade deficit. This issue is an important one for rural America, because low-skill manufacturing jobs—the most vulnerable to foreign competition—have been an important source of good wages and benefits for residents of rural areas without a college education.

A new analysis of employment related to U.S. international trade during 1972-92 shows that the United States exports goods that are relatively skill-intensive compared with its imports (see “Estimating Trade-Related Employment”). Figure 1 shows that 19 percent of jobs supported by U.S. exports were in high-skill white-collar occupations (jobs that generally require a 4-year or 2-year college degree). Thirty-five percent of export-related jobs were in medium-skill occupations that included a mix of white-collar jobs often not requiring college (clerical and sales) and blue-collar jobs requiring significant skills that can be obtained through experience on the job (precision production, craft, and repair jobs). Forty-six percent of export jobs were in low-skill occupations (machine operators, fabricators, laborers, food service, custodial, agricultural, forestry, and fishing jobs). If the goods imported to the United States in 1992 had been produced domestically, they would have generated an almost equal number of jobs, but 54 percent of those jobs would have been in low-skill occupations, a higher percentage than the 46 percent low-skill share of export jobs. An estimated 18 percent of import jobs would have been high-skill jobs (about the same as the 19-percent high-skill share for exports) and 28 percent medium-skill (less than the 35-percent share for exports). These estimates confirm that jobs displaced by imports are predominantly low-skill, while exports create more medium-skill jobs, reflecting the U.S. competitive advantage in skill-intensive goods and services.

Goods and services produced for the domestic market are much more skill-intensive than either exports or imports (fig. 1). Seventy percent of jobs supported by domestic demand (purchases by U.S. consumers, business investment demand, and government purchases of goods and services) are in either high- or medium-skill occupations compared with 54 percent for exports and 46 percent for imports. The difference is partly explained by the important share of services (among the more skill-intensive sectors) in domestic demand. Imports and exports consist largely of manufactured and agricultural goods, which are less skill-intensive.

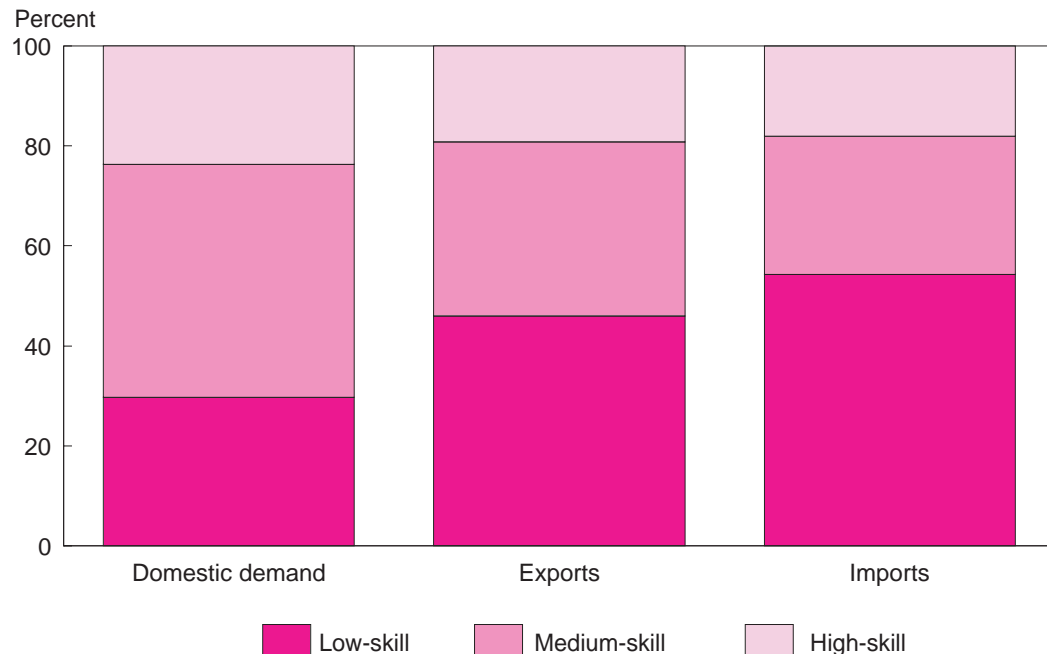
### Domestic Demand Creates Skilled Jobs

U.S. jobs displaced by imports are slightly greater than the number created by exports (consistent with the Nation’s negative trade balance). In 1992, exports supported 9.1 million jobs, and imports displaced an estimated 9.7 million, an estimated net loss of 627,000 jobs (table 1). When viewed in context of the national economy, however, international trade is only a minor factor in explaining overall trends in U.S. employment. The net loss of 627,000 jobs due to international trade is only 0.5 percent of all U.S. jobs (121 million). Even the net loss of 2.2 million jobs due to trade in 1987 (when the U.S. trade deficit was unusually high) represented only 2 percent of total employment.

Some observers have argued that growth of imports has led to increasing earnings inequality as opportunities erode for less-skilled workers, while demand and wages for high-skilled workers continue to increase. Careful studies of the data have shown that the magnitude of job loss associated with increasing imports over the past several decades was not nearly large enough to explain the overall shifts in the U.S. job market. Studies have found that the trend toward more skilled workers occurred in all industries, including those that produced goods and services for the domestic market. Only a minor part of the decline in production workers was due to the decline of import-sensitive industries. Over the two decades from



Figure 1  
**Skill share of jobs, by type of demand, 1992**  
*Most jobs displaced by imports are low-skill*



Source: Calculated by ERS using data from the Department of Commerce and Bureau of Labor Statistics.

Table 1  
**Employment attributed to exports, imports, and domestic demand, 1972-92**  
*International trade accounts for a small share of the longrun change in jobs*

Source of jobs	1972	1987	1992
		1,000 jobs	
Net effect of trade	-140	-2,196	-627
Exports	3,574	6,592	9,114
Imports <sup>1</sup>	-3,714	-8,788	-9,741
Total U.S. jobs	84,586	114,366	121,000

<sup>1</sup>Number of jobs that would be required to produce imported goods in the United States.

Source: Calculated by ERS using data from the Department of Commerce and Bureau of Labor Statistics.

1972 to 1992, the U.S. economy added 36 million jobs, but the employment effects of exports and imports offset each other. Jobs attributed to exports increased by an estimated 5.5 million between 1972 and 1992, while increased imports displaced the equivalent of 6.0 million.

### Exporting Businesses Raise Skill Requirements

While the net employment effect of trade is small, these numbers may understate the importance of exports. Another recent ERS study (H. F. Gale, "Rural Manufacturers in the Export Market," *Rural Development Perspectives*, Vol. 13, No. 2, August 1998, pp. 24-30) looked at involvement of rural and urban manufacturing businesses in the export market, and found

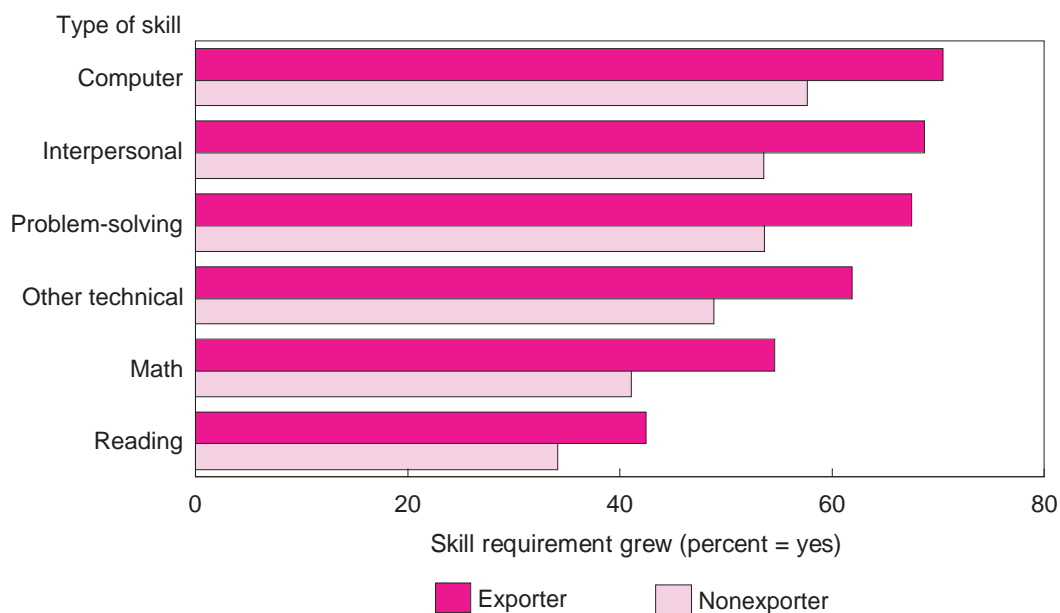
that exports have an important positive association with business performance and demand for skilled workers in both urban and rural areas. The study, based on ERS's 1996 Rural Manufacturing Survey, indicates that nearly half of nonmetro manufacturing establishments sell at least part of their output in export markets. Estimated nonmetro exports amounted to about \$64 billion in 1995, or about 10 percent of nonmetro manufacturing shipments in that year. This research also found that nonmetro plants with exports are larger, grow faster, pay higher wages, and are more likely to make product improvements and to use innovative management practices and telecommunications technology.

Additional analysis of these data shows that exporters have more rapidly growing skill demands than nonexporters. For example, in 1996, 70 percent of manufacturing plants with exports said their requirements for computer skills increased over the previous 3 years compared with 57 percent of nonexporters. Exporters were more than 10 percentage points more likely than nonexporters to report an increase in each of six employee skill requirements (fig. 2). When asked about problems finding different types of skills, exporters were also more likely than nonexporters to report problems finding workers with adequate interpersonal/teamwork, computer, and other technical skills. (Similar percentages of exporters and nonexporters report problems finding workers with the most problematic skills: reliable and acceptable work attitude and problem-solving.) Exporters are also doing more to upgrade their workers' skills. Fifty-five percent of nonmetro exporters said they provided formal training (classes or courses to learn new skills and technologies) compared with only 41 percent of nonexporters.

Other research has found an association between exports and business performance, but a direct link between exports and business success has not been established. Bernard and Jensen ("Exporters, Jobs, and Wages in U.S. Manufacturing: 1976-87," *Brookings Papers in Economic Activity: Microeconomics*, 1995, pp. 67-119) followed a large sample of manufacturing establishments over time and concluded that exporting, by itself, was not a good predictor of success. Exporting may just be one expression of a higher

Figure 2  
**Reported increase in skill requirements by nonmetro manufacturing employers, 1994-96**

*Exporting establishments were more likely to report increases in all types of skill requirements*



Note: Chart shows percentage of establishments reporting that the skill requirement "increased a lot" or "increased somewhat."

Source: Analysis of ERS's 1996 Rural Manufacturing Survey, weighted for stratification.

degree of management skill and business acumen, rather than the single key to business success. Nevertheless, exposure to world markets seems to raise competitiveness and productivity of businesses. The effect of exposure to world markets (pressure to increase productivity, reduce costs, adopt the latest technologies, and upgrade worker skills) reaches manufacturing plants even in the most remote rural areas.

### **Implications for Rural Areas**

The Census Bureau's *Annual Survey of Manufactures* indicates that the mix of white-collar "nonproduction workers" (managers and professionals) and less skilled blue-collar production workers in manufacturing has stabilized during the 1990's. However, salaries and wages for white-collar workers have climbed faster than wages for blue-collar "production workers." Competition from low-cost foreign competitors may have played a role in this divergence by inducing manufacturers to hold down production worker wages and move operations to nonunion plants. At the same time, many companies cut back on the number of middle managers in the early 1990's, which may have boosted average white-collar wages. Whatever the cause, it seems clear that the earnings premium for skilled over less-skilled workers is increasing. This is a concern for rural areas, since they tend to attract relatively few skilled jobs. In 1992, nonmetro areas had 25.6 percent of production (less-skilled) workers in manufacturing, but only 13.5 percent of nonproduction (skilled) workers.

Rural communities can prepare themselves to compete in domestic and world markets by developing a labor force with the skills and flexibility that modern employers demand. Higher productivity, obtained through technical knowledge and ability, good work attitude, and skills in teamwork and problem-solving, can enhance rural business competitiveness not only in international markets but also in the vast domestic market. Service jobs, the fastest-growing segment of the labor market, are created primarily by domestic demand, and have historically been located in urban areas. While many service jobs are in low-skill occupations (for example, food service, clerical, administrative support), service industries also employ a large share of workers in high-skill professional occupations, including administrative, engineering, legal, and health services. Rural areas also face the challenge of retaining the most-skilled (college-educated) workers, who often migrate to high-skill jobs in urban areas. [Chin Lee, 202-694-5354, [chinlee@econ.ag.gov](mailto:chinlee@econ.ag.gov); Gerald Schluter, 202-694-5395, [schluter@econ.ag.gov](mailto:schluter@econ.ag.gov); Fred Gale, [fgale@econ.ag.gov](mailto:fgale@econ.ag.gov), 202-694-5349]

### Estimating Trade-Related Employment

When economists want to know how much employment is generated throughout the economy by exports, they estimate the “factor content” of international trade. This type of analysis uses an input-output model of the U.S. economy to estimate all the purchases from various sectors of the economy needed to produce goods sold for export. For example, if the United States exported \$10 million worth of steel, the input-output model would provide an estimate of how much output would be required from each sector of the economy to produce that much steel. Employment requirements to produce the steel are estimated by multiplying these outputs by ratios of employment per unit of output.

A study by Chinkook Lee and Gerald Schluter (“Effect of Trade on the Demand for Skilled and Unskilled Workers,” *Economic Systems Research*, Vol. 11, No. 1, 1999, pp. 49-65) used this technique to look at how changes in exports, imports, and domestic demand affected employment of high-, medium-, and low-skill workers for the years 1972, 1987, and 1992. They classified demand for goods and services produced in the economy into four categories: consumer spending (C), business investment (I), government purchases (G), and net exports: exports (X) minus imports (M). For this study, C+I+G are termed domestic demand.

The economy was divided into 80 sectors or industries. Using a standard input-output model of the economy, Lee and Schluter estimated the employment requirements in each of 80 sectors of the economy needed to support domestic and export demand for goods and services. They also estimated the employment that would be needed to produce the Nation’s imports if they were manufactured domestically.

Lee and Schluter estimated the skill content of employment by classifying the nine major Bureau of Labor Statistics occupational groups into high-, medium-, and low-skill categories (see table below). The high- and medium-skill groups roughly correspond to the “nonproduction workers” classification used by the Census Bureau in reporting Annual Survey of Manufactures (ASM) data, while the low-skill group roughly corresponds to “production workers.” (A number of previous studies used ASM data, equating nonproduction workers with high skill, and production workers with low skill.) The authors report that their overall results did not change when they used alternative skill classifications. This classification system differs slightly from the system used in “Future Job Growth Will Benefit Educated Workers Most,” which reports expected employment growth for occupations by the amount of education and training required.

Lee and Schluter compared the number of jobs at various skill levels created by the three different components of demand. Estimates were made for 3 years: 1972, 1987, and 1992 to evaluate trends over the past two decades.

#### Skill classification of workers

*Occupational groups were classified into three skill levels*

Skill category	Occupations
High-skill	Executive, administrative, and managerial jobs Professional specialty Technicians and related support
Medium-skill	Sales occupations Administrative support, including clerical Precision production, craft, and repair
Low-skill	Service occupations (for example, food service, clerks, custodial services) Operators, fabricators, and laborers Farming, forestry, and fishing

Source: Classification of BLS occupations used by Lee and Schluter.

## Manufacturing Employers Report Widespread Problems With Labor Quality

*Labor quality is a chief concern of manufacturing employers, both rural and urban. New skill demands due to advanced technology use explain part of the problem, but dissatisfaction with work attitude is common to high- and low-tech employers. Lack of a high school diploma is linked to problems with worker skills and attitude.*

According to ERS's 1996 Rural Manufacturing Survey (see app. 1, "Data Sources"), both rural and urban manufacturing firms place concerns about the quality of local labor at the top of a list of problems associated with their business locations (see David McGranahan, *Local Problems Facing Manufacturers*, USDA/ERS, AIB-736-03, March 1998). Local labor quality was cited as a problem by three-fourths of nonmetro manufacturers, including one-third who said it was a major problem. Labor quality was the leading problem for both urban and rural employers. Anecdotal evidence suggests that the problem is not limited to manufacturing, either. For example, in a 1998 survey conducted by the Business Council of New York State, 44 percent of businesses rated skills of newly hired high-school graduates as "poor" or "very poor" (see "Untrained Malady: New Hires Often Lack Elementary Knowledge for the Job," *Wall Street Journal*, August 25, 1998, p. 1).

Many observers are concerned that labor quality problems indicate a mismatch between the types of skills that employers demand and the skills that workers are acquiring through schooling, work experience, and other training. Complex technology and new management practices increasingly require workers to be computer-literate, able to work in teams, and take on responsibility for decisionmaking and quality control. At the same time, concern continues about the adequacy of schools, colleges, vocational institutions, and on-the-job training for producing workers with the needed skills and productivity that will ultimately determine the economy's competitiveness. This is of particular concern for rural communities, which often have limited resources available for education, a job base heavily weighted toward low-to-moderate skill levels, and a brain drain of talented, educated youth to urban areas. In this article, we use data from ERS's 1996 Rural Manufacturing Survey (RMS) to look at demand and supply factors that contribute to the labor quality problem.

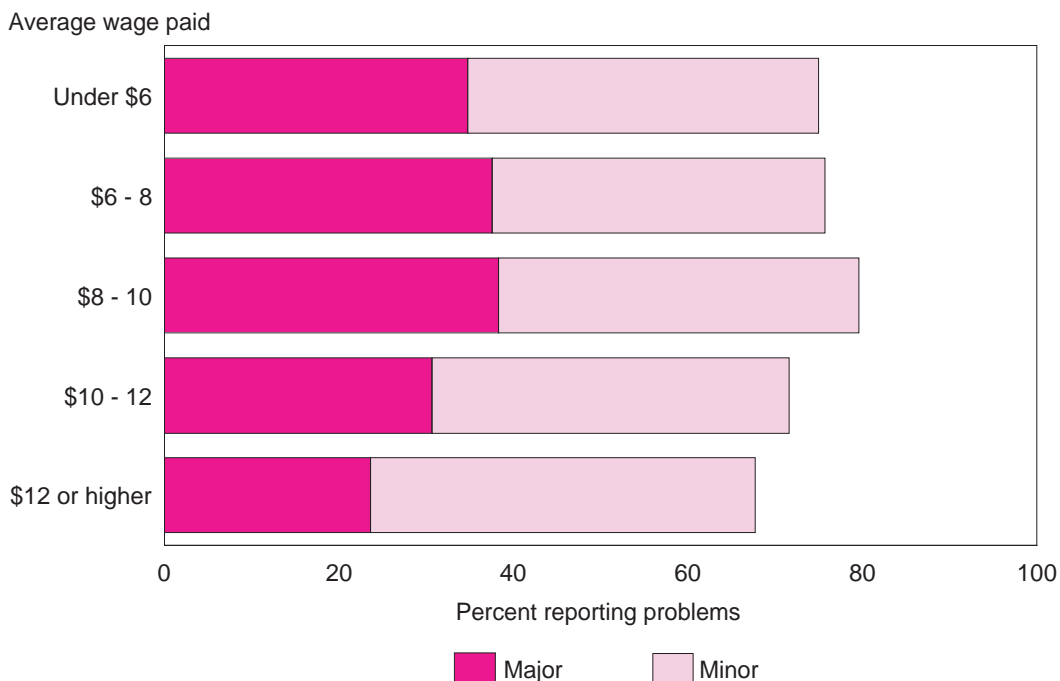
### Fewer Problems Reported by High-Wage Employers

The laws of supply and demand suggest that a shortage of worker skill can be alleviated by raising the wage offered to employees. One would expect that employers who pay relatively high wages would have less trouble satisfying their demand for skills. The RMS shows that employers paying the highest wages are less likely to report major problems with local labor quality, but the labor quality problem is still widespread among employers paying high wages (fig. 1). Twenty-three percent of nonmetro manufacturing employers paying the highest wages (in excess of \$12.00 per hour for production workers) reported labor quality as a major problem, clearly less than the 40 percent of those paying in the \$6.00-\$10.00 range and 36 percent of those paying less than \$6.00. While high-wage employers are slightly less likely to report labor quality as a major problem, they are slightly more likely to report labor quality as a minor problem. Labor quality (along with State and local tax rates and environmental regulations) is the most cited locational problem even for high-wage employers. Similarly, the percentage of employers who say they have had problems finding qualified applicants for production jobs is the same for high- and low-wage employers (60 percent). Adjusting for employer characteristics, such as industry and location, yields the same conclusion: the wage paid by the employer explains only part of the labor quality problem. Part of the high incidence of labor quality problems may be due to tight labor markets during the mid-1990's, when the survey was conducted (see "Other Factors May Contribute to Labor Quality Problems"), but further analysis indicates that changing demand for worker skills plays an important role.

### Growing Demand for Skills

Most manufacturing establishments included in the RMS indicated that their skill requirements had increased over the previous 3 years (see Ruy Teixeira, *Rural and Urban Manufacturing Workers: Similar Problems, Similar Challenges*, USDA/ERS, AIB-736-02,

Figure 1  
**Nonmetro manufacturers reporting problems with quality of local labor, by average wage, 1996**  
*Employers paying high wages are less likely to report problems with labor quality*



Source: Calculated by ERS using data from the Rural Manufacturing Survey.

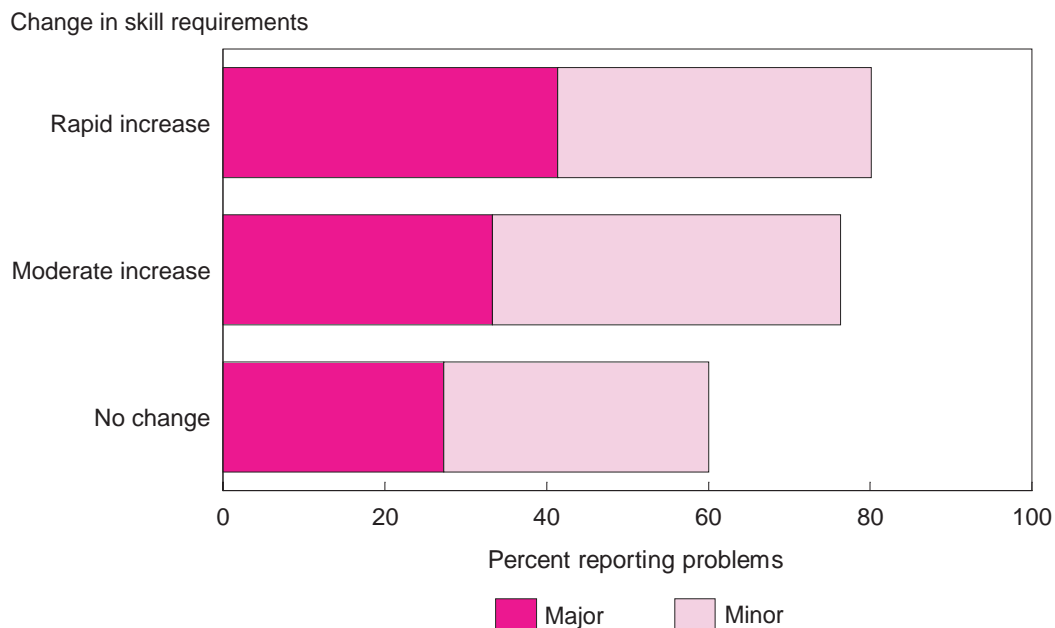
January 1998). Eighty-six percent of employers said that requirements for at least one of six types of skill (computer, interpersonal/teamwork, problem-solving, other technical, basic math, basic reading skills) had “increased a little” or “increased a lot.” Twenty-five percent said each of the six skill requirements increased, while only 14 percent reported no change in any of the six skill requirements. Growth in skill demand was not significantly different between metro and nonmetro respondents.

As might be expected, employers with the fastest growth in skill requirements are the most likely to report labor quality problems. More than 80 percent of nonmetro employers with the fastest growth in skill requirements (those who reported that each of six skill requirements increased) said that labor quality was either a major or minor problem (fig. 2). Employers who reported no change in skill requirements were less likely to report labor quality problems. Still, labor quality was reported as a major or minor problem by more than half (56 percent) of employers who reported no changes in skill requirements.

Part of the labor quality problem may be explained by adoption of new technologies and management practices that require greater technical, interpersonal, and problem-solving skills. The study by Teixeira found that rural firms classified as “high adopters” of new technology reported faster increases in skill requirements and were more likely to report problems finding adequately skilled workers. McGranahan’s study found that high adopters report more problems with local labor quality than low adopters, but the difference is small.

However, when we look at the types of skills that employers have difficulty finding, we learn that technology and increasing complexity of job tasks are only part of the explanation for labor quality problems. Even more difficult than finding workers with necessary computer and technical skills is finding workers with a very basic “skill”—work attitude. Problems with work attitude were reported more frequently than any of six other skill

Figure 2  
**Nonmetro manufacturers reporting labor quality problems, by degree of skill requirement increase, 1996**  
*More rapid increase in skill requirements was associated with greater incidence of labor quality problems*



Note: Rapid increase = 6 skill requirements increased; moderate = 1-5 skill requirements increased; no change = no skill requirements increased.

Source: Calculated by ERS using data from the Rural Manufacturing Survey.

problems. Teixeira found that 31 percent of manufacturing employers said finding job applicants with “a reliable and acceptable work attitude” was a major problem, and 25 percent said it was a minor problem. Major problems with computer skills were reported by nonmetro employers about half as often as major problems finding job applicants with a good work attitude. Problem-solving skills were reported as the second most difficult skill to find, which may reflect the use of new types of work organization that give employees increased responsibility. Interpersonal/teamwork skills were ranked slightly behind computer skills. Basic math and reading skills were reported as problems by the fewest employers. There was little difference between metro and nonmetro employers in the incidence of these problems.

The work attitude problems are echoed in the Business Council of New York survey reported by the *Wall Street Journal*. One employer was quoted as saying she “...has trouble finding people with ‘basic skills’ like being on time.” Another employer in the restaurant industry quoted in the *Journal* said that “restaurants hire for ‘attitude, not skills.’” Further analysis of the RMS shows that the work attitude problem appears to be common to both high- and low-technology employers. While high adopters of technologies report problems with other skills much more commonly than low adopters, the two groups report work attitude problems with equal frequency. Attitude is clearly the leading skill problem for low adopters of technology, and, while it is not the leading problem for high adopters, it is important for that group as well.

### High School Completion an Important Factor

There seems to be a widespread perception in the business community that the skills and work attitude of workers are declining in quality. At the same time, there is widespread

concern about the quality of schools and their ability to prepare students for the workforce. The RMS does not permit us to look at trends in worker skills or to look directly at the performance of educational institutions. But the data indicate that high school completion is an important factor in determining labor quality. Comparing plants where all employees finished high school with plants where fewer than 75 percent of workers finished high school shows that labor quality problems are more severe in plants where education levels are lower (table 1). Plants where all workers are high school graduates are much less likely to report a major problem with local labor quality (25 percent) than are plants where fewer than 75 percent of employees finished high school (46 percent). Plants employing only high school graduates are less likely to report problems finding adequately skilled job applicants (53 versus 71 percent), and less likely to report major problems finding workers with six of seven types of skills than those with fewer high school graduates. "Other technical skill" is the only skill type for which the difference between the two groups is not significant.

Work attitude is clearly the leading problem for plants employing fewer than 75 percent high school graduates. Forty-three percent of these plants said finding workers with a good work attitude was a major problem. Among these plants, work attitude is reported much more frequently than any other skill problem. These plants report work attitude problems twice as frequently as those where all workers completed high school. Similarly, plants with fewer graduates are more likely to report problems with problem-solving skills and interpersonal/teamwork skills. These skills are not a major part of formal high school curricula, so, at first glance, the connection with high school completion seems odd. The connection may suggest an unconventional view of how a high school education prepares people for the job market, at least in terms of preparation for jobs with moderate skill requirements (such as manufacturing jobs). While high school education appears to build basic academic skills, these seem to be of relatively low priority to manu-

Table 1

**Labor quality problems reported by nonmetro manufacturers, by high school completion rate of the workforce, 1996**

*Plants where all employees graduated from high school are less likely to report labor quality problems*

Problems	Proportion of workers in the plant who graduated from high school	
	Less than 75 percent	All workers completed high school
	Percent	
Major problem with local labor force quality	46	25
Problems finding qualified applicants for production jobs	71	53
Major problems finding job applicants with:		
Basic reading skills	11	2
Basic math skills	18	9
Interpersonal/teamwork skills	21	10
Problem-solving skills	27	18
Computer skills	18	14
Other technical skills	21	20
Good work attitude	43	21
	Number	
Sample observations	640	645

Source: Calculated by ERS using data from the Rural Manufacturing Survey.



facturing employers. Basic characteristics and attitudes that help individuals finish high school (such as the ability to follow directions, self-discipline, interpersonal skills) are also valuable to employers. A high school diploma signals to an employer not only actual knowledge, but also a greater likelihood that the worker possesses desired characteristics and attitudes that will make him or her a valuable employee.

### **Educated Workforce More Costly**

The above discussion begs the question of why plants hire employees without high school diplomas. Based on weighted estimates from the ERS survey, about 30 percent of nonmetro manufacturers employ only high school graduates, while 23 percent have a workforce where fewer than 75 percent graduated. As is pointed out elsewhere in this issue (see “Advanced Technology Means Better Pay and Benefits for Workers”), employing a more educated workforce is costlier. Plants offering low wages and benefits will find attracting high school graduates difficult.

For many employers, however, the education level of their workforce may be dictated by the local pool of labor. In the past, many companies chose to site their plants in areas where high school graduation rates were low to have access to low-wage, nonunionized labor. Given the apparent high degree of frustration with labor quality in plants with a less-educated workforce, this “low road” strategy is likely to become less viable. This suggests that new plants would be less likely to open in areas with a less educated workforce, and old plants in such areas would be prime candidates for closure. However, we should not expect a wholesale relocation of industry to areas where the “best” labor is located. Studies of business location decisions show that labor issues are important, but not a dominant factor in location choices. This suggests that many businesses are tied for other reasons (access to natural resources, markets, transportation, or personal preference) to a particular location where the available pool of labor is inadequate.

### **Employers Provide More Training to Address Labor Quality Problems**

Many employers are addressing skill deficiencies by training their employees. The ERS survey shows that 47 percent of nonmetro manufacturing employers provide formal training for their workers, and about three-fourths of those reported increasing the amount of training over the previous 3 years. Labor quality problems appear to have induced some firms to increase training (fig. 3). Thirty-five percent of employers who reported major problems with labor quality said that the amount of training they provide had “increased a lot” over the previous 3 years, compared with 23 percent of those who reported no problem with labor quality.

The dominant reasons for the rise in training appear to be demand-side factors stemming from the greater need for product quality, efficiency, and skill. Teixeira reports that, when rural manufacturers are asked for their reasons for increasing the amount of training, the most frequent response is “heightened concern about product quality,” followed by “to improve productivity.” Adoption of new equipment and management practices were cited as very important reasons by 40-50 percent of employers who said they increased training. A supply-side factor, “new employees less skilled than previous years,” is the least cited reason. Still, about 70 percent of rural manufacturers who increased training said less skilled employees were either “very important” or “somewhat important” reasons for the increase.

### **Supplying Adequately Skilled Workers Is a Difficult Challenge**

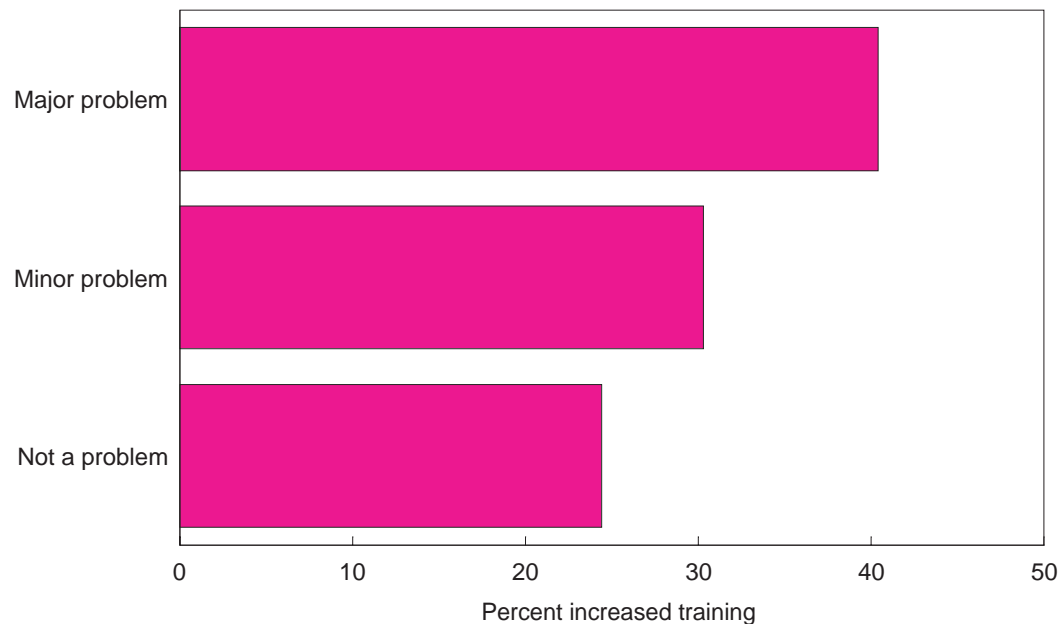
Adequacy of worker skills seems to be a concern for all types of manufacturing employers and for both rural and urban communities. Growing demand for skill appears to explain part, but not all, of the labor quality problem. Problems with labor quality are widely reported even by employers who say that skill requirements have grown little or stayed the same. The supply of adequately skilled workers seems to be an important part of the problem. Some commentators and business leaders suggest that poor skills and work attitude are a result of declining educational standards and cultural change in American society, but long- and short-run economic factors may also play a role. The pool of labor available to manufacturing employers may be shrinking as more talented workers are

Figure 3

### Rural manufacturers who reported training "increased a lot" during previous 3 years, by reported problems with labor quality

*Firms reporting labor quality problems also increased training*

Local labor quality



Source: Calculated by ERS using data from the Rural Manufacturing Survey.

drawn to growing white-collar occupations. The tight job market produced by strong economic growth in the mid-1990's may play a role by increasing the number of opportunities for workers and increasing job turnover rates.

While academic institutions, individuals, and companies have expended considerable effort to upgrade computer skills, they have done less to address problems with work attitude and skills that are more difficult to develop, such as problem-solving and teamwork. Short-term employer training may address needs for computer and technical skills, but building basic skills, such as work attitude and problem-solving ability is more difficult to accomplish on the job. Maintaining and improving the quality of the local labor force is a difficult and important challenge facing many communities, both rural and urban. [Fred Gale, 202-694-5349, fgale@econ.ag.gov]

#### Other Factors May Contribute to Labor Quality Problems

This article focuses on the effects of growing skill demands on labor quality problems, but several other factors may also contribute. Tight labor markets during the mid-1990's economic expansion could be one explanation for the seriousness of labor quality problems, even among high-wage employers. Abundant job opportunities in a strong job market make it difficult for an employer to attract and keep sufficient numbers of adequately skilled workers, since other employers are also hiring new workers. Additionally, rising wages and job opportunities in services and other sectors may have drawn workers away from manufacturing, shrinking the pool of labor available to manufacturing employers. Demographic trends (the relatively small "baby bust" cohort of entry-level workers) may also have helped to shrink the pool of potential manufacturing workers. These factors may help account for the high incidence of labor quality problems found in this survey.

## Advanced Technology Means Better Pay and Benefits for Workers

*Manufacturing employers vary considerably in the wages and benefits they offer. "Good jobs" with high wages and benefits are linked to a number of factors, including use of advanced technology and management practices, which require greater skills and training. Nonmetro technology-intensive plants added jobs during 1992-95. Promotion of technology-intensive manufacturing appears to be a promising development strategy.*

**E**conomic development efforts tend to focus on creating jobs, but not all jobs are created equal. Most communities prefer employers who offer jobs with high pay and a range of benefits, including health insurance coverage, retirement, leave, and training. Benefits are important not only to workers, but to their families as well. For example, many farmers and other rural self-employed people rely on health insurance coverage obtained through their spouse's employer.

This article explores the factors associated with higher pay and benefits using ERS's Rural Manufacturing Survey (RMS, see app. A, "Definitions"). Manufacturing has been an important source of well-paying jobs with good benefits for rural workers who lack a college education.

### **Nonunion High Technology Users Offer Compensation Comparable to Unionized Plants**

Unions have had an important influence in raising wages and benefits for manufacturing workers. On average, unionized nonmetro plants pay 25 percent more than nonunion plants, and are more likely to provide most types of benefits. Nearly all union plants offer health benefits. Economists disagree on how much unions raise wages. Part of the difference is due to the fact that unionized plants are larger than nonunion plants, and larger plants pay more and provide more benefits. The differential actually due to unionization is probably not as large as indicated by a simple comparison of average wages, but it is surely significant.

While unions benefited workers, high labor costs associated with unions are an obstacle to job creation, and private sector unionization has declined in recent years. Many companies have located their plants in rural areas to avoid unions. Only 14 percent of nonmetro plants in the RMS are unionized compared with about half of urban plants (although our small urban sample size makes the urban number unreliable). There has been some debate over the effect of unions on business locations and job creation, but a recent study showed that counties in "right to work" States have considerably more manufacturing activity than similar counties in States where workers can be compelled to join a union (see T. J. Holmes, "The Effect of State Policies on the Location of Manufacturing," *Journal of Political Economy*, Vol. 106, August 1998, pp. 667-705).

As union jobs become scarcer, plants using advanced technology and management practices appear to be emerging as another source of jobs with high wages and benefits. Plants classified as "high adopters" of technology and management practices paid an average of \$10.07 per hour compared with \$8.81 for "middle adopters," and \$8.09 for "low adopters" (see "Measuring Advanced Technology Use.") High adopters were also more likely to provide each of five benefits.

Advanced technology and management practices are used more commonly by larger plants, so (as was the case in measuring the effect of unions on wages) the apparent effect of technology on wages and benefits may be partly due to the plant-size effect. To avoid this pitfall, table 1 compares wages and benefits of high and low adopters for plants of similar size (50-249 employees). Nonunion high adopters pay wages that are 35 percent higher than wages paid by low adopters. They are much more likely to offer benefits, as well. Ninety-five percent of high adopters offer health benefits compared with 79 percent of low adopters. The most striking difference is in training. Eighty percent of high adopters offer training compared with only 18 percent of low adopters, reflecting a greater need for skill in technologically advanced plants.

Nonunion high adopters provide similar pay and benefits to those offered by unionized plants. Wages are 10 percent lower, but nonunion high-adopter plants are more likely to

Table 1

**Worker compensation in rural medium-sized manufacturing establishments, by technology use and unionization***Nonunion plants that use advanced technology offer compensation comparable to union plants*

Type of compensation	Nonunion plants		Union plants
	Low adopter	High adopter	
Average hourly wage	7.13	9.59	10.50
Establishments offering benefits:			
Leave	78.6	98.2	93.2
Health	78.6	94.9	98.3
Retirement	46.6	88.0	89.1
Training	18.1	79.6	59.8
Profit sharing	27.8	65.2	36.1

Note: Includes only nonmetro plants employing 50-249 workers.

Source: Calculated by ERS using Rural Manufacturing Survey.

offer profit-sharing or stock-option plans, which may reflect a different philosophy of compensation that is aimed at achieving greater worker reliability and lower turnover by giving employees a stake in the company's success. High adopters are also more likely to offer training than are unionized plants. Other benefits are similar between nonunion high-adopter plants and union plants.

**Wages Grew Faster in Plants Using Advanced Technology**

Before endorsing advanced technology as a key to creating "good jobs," more careful analysis is required. Advanced technology and management practices increase manufacturing worker skill requirements and productivity. While this should lead to higher wages and benefits, other research found that adoption of new technology was associated with higher earnings (as we found here), but no connection was found between adoption and growth of earnings. That suggests that the earnings difference could be due to the fact that companies paying the highest wages are also the most likely to adopt new technology.

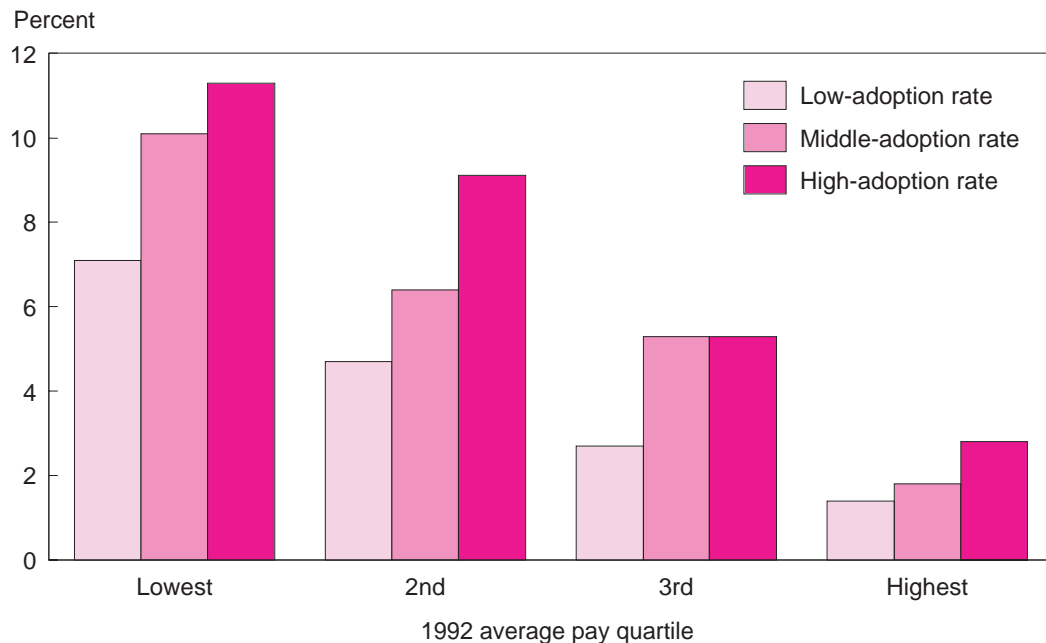
The RMS data do not allow us to directly examine wages "before and after" technology adoption. We can, however, look at whether wages grew faster between 1992 and 1995 in plants that used advanced technology. Again, it is important to take precautions to avoid reaching a wrong conclusion. Plants were divided into quartiles based on the average wages they reported paying their employees in 1992 because percentage gains in wages were generally greater the lower the 1992 wage levels were. For each 1992 wage quartile, the 1992-95 percentage growth in average wage was compared for low, middle, and high adopters. In each 1992 wage quartile, the fastest 1992-95 wage growth was reported by high adopters—11.3 percent for those in the lowest quartile, and 2.8 percent for those in the highest quartile (fig. 1). One reason that the other research may have found little gain in pay associated with new technology may be that it focused on larger, unionized establishments that already had high wages. Our results are not conclusive evidence that technology use leads to wage growth, but they certainly suggest that high technology leads to faster growth in pay, particularly in initially low-wage plants.

**Technology-Intensive Plants Have Higher Pay and Benefits Than Others in the Same Industry**

Another pitfall that we need to avoid is the possibility that the difference in earnings associated with technology is actually due to industry differences, since industries vary in their

Figure 1  
**Nonmetro manufacturing wage growth, 1992-95, by 1992 wage level and technology adoption**

*High adopters of technology reported faster wage growth*



Note: Adjusted for inflation.

Source: Calculated by ERS using data from the Rural Manufacturing Survey.

use of technology. Other research has found that the rural mix of industries explains much of the overall difference in technology use between rural and urban manufacturing (see Fred Gale, *Is There a Rural-Urban Technology Gap?* AIB-736-01, USDA/ERS, August 1997).

Rural industries vary considerably in the wages and benefits they offer (table 2). The apparel industry offers the lowest wages and is least likely to offer health and retirement benefits. On the other extreme, chemical, paper, and petroleum plants tend to have the highest wages and benefits. Plants in industries that are heavily represented in rural areas (food, textiles, apparel, lumber and wood products) tend to not only be low in advanced technology use, but they also offer relatively low wages and benefits. We need to be careful, therefore, to differentiate between effects of technology and industry. It could be that differences in wages are largely due to the greater use of new technologies in more urban-oriented industries.

The RMS data indicate a considerable range in technology use within all industries, including rural-oriented industries. For example, specific types of food processing industries, such as meat packing, poultry slaughtering, fluid milk, and canned fruits, vegetables, and preserves, nearly all have both low and high adopters. Table 3 compares pay and benefits offered by low and high adopters in eight key industries for which meaningful comparisons could be made. In each industry, high adopters report higher average wages than low adopters. The difference ranges from 13 percent in fabricated metal products and industrial machinery to more than 30 percent in several industries. The percentage of plants offering both retirement and health benefits is also higher among high adopters. Again, the smallest difference (slightly more than 20 percentage points) is in fabricated metal products and industrial machinery. In the textile, apparel, and lumber and wood products industries, high-adopter plants are about twice as likely as low

Table 2

**Nonmetro manufacturing wages and benefits, by industry, 1995***Manufacturing industries vary considerably in the wages and benefits they offer*

Average hourly wage (Dollars)	Share of establishments providing both health and retirement benefits		
	Under 50 percent	50 - 75 percent	Over 75 percent
Over 10		Petroleum	Chemicals
8.75 - 10.00	Nonauto transportation equipment	Industrial machinery Fabricated metal products Primary metals Printing Stone, clay, and glass Automobiles	Paper
7.50 - 8.75	Lumber	Rubber and plastics Instruments Electrical equipment Food processing Furniture Textiles Miscellaneous manufacturing	
<7.50	Apparel	Leather	

Source: Rural Manufacturing Survey.

Table 3

**Nonmetro compensation by industry and technology use, 1995***High adopters provide higher wages and benefits in each of eight major manufacturing industries*

Industry	Average hourly wage of—			Plants providing health and retirement benefits		
	Low adopters	High adopters	Difference	Low adopters	High adopters	Difference
	Dollars			Percent		
Food	7.02	9.70	38.1	54.2	90.3	36.1
Textiles	7.21	8.89	23.3	45.1	91.8	46.7
Apparel	6.08	7.75	27.5	40.8	81.4	40.6
Lumber and wood products	7.39	9.63	30.3	40.5	87.6	47.1
Rubber and miscellaneous plastics	6.96	9.25	32.9	56.5	90.7	34.3
Stone, clay, and glass	8.80	10.78	22.5	66.4	98.8	32.4
Fabricated metal products	9.55	10.85	13.6	68.5	91.8	23.4
Industrial machinery	9.19	10.43	13.5	65.7	86.8	21.1

Source: Calculated by ERS using data from Rural Manufacturing Survey.

adopters to offer retirement and health benefits. (All differences between low and high adopters are statistically significant here, as elsewhere in this article.)

### **Technology-Intensive Plants Hire Workers with More Schooling, but Pay More No Matter What the Schooling**

Advanced technology requires greater skill levels, which means workers with higher levels of schooling. In high-adopter plants, an average of 86 percent of production workers

graduated from high school compared with 78 percent in low-adopter plants. High adopters also report a higher percentage of workers with schooling beyond high school (15 versus 8 percent).

Not surprisingly, plants that hire more educated workers pay better wages. Plants where all production workers completed high school pay 27 percent more, on average, than plants where less than 75 percent of workers were high school graduates. This raises the possibility that technology wage differentials reflect differences in worker education. However, comparing plants with similar worker education levels shows once again a considerable technology advantage in wages and benefits (figs. 2, 3).

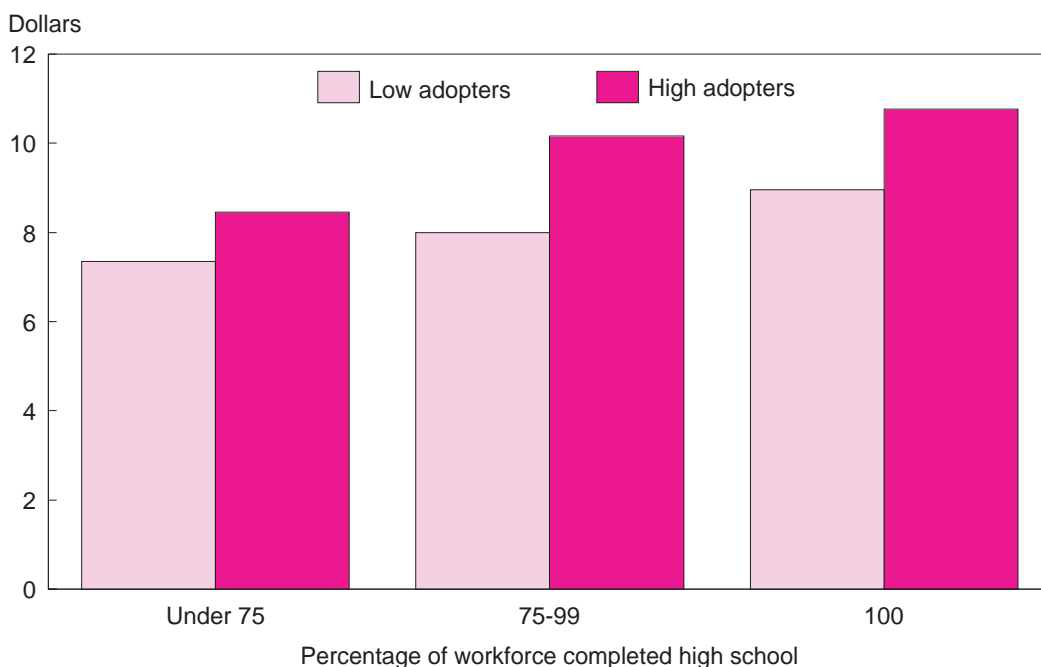
**High Technology Adopters Are a Source of Higher Wages and Benefits in Counties with Low Graduation Rates**

To some extent, the education level of a plant’s workers is determined by the hiring strategy of the firm, but it may also be affected by the local pool of labor available to the plant. Research has found no difference in rural-urban technology use (when comparing plants in the same industry), but technology use does vary by local education level. A manufacturing plant located in a rural county with low rates of high school graduation for prime working age adults (ages 25-44), is more likely to be a low adopter (34 percent of plants) than a plant located in a county with a high graduation rate (21 percent) (fig. 4).

Among counties with similar high school graduation rates, wages and benefits are highest in plants that are high adopters of technology. The technology advantage in wages is similar in the most and least educated counties—a difference of roughly \$2 per hour, or 25 percent (table 4).

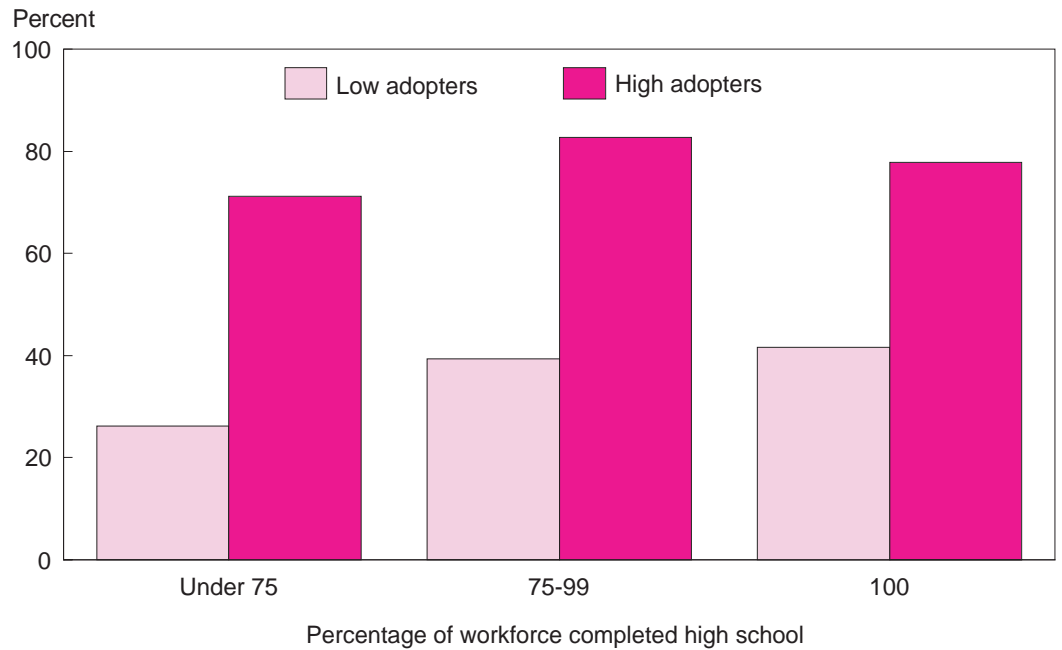
Figure 2  
**Nonmetro manufacturing wages, by workforce education level and technology use, 1995**

*High adopters pay higher wages to workers at a given education level*



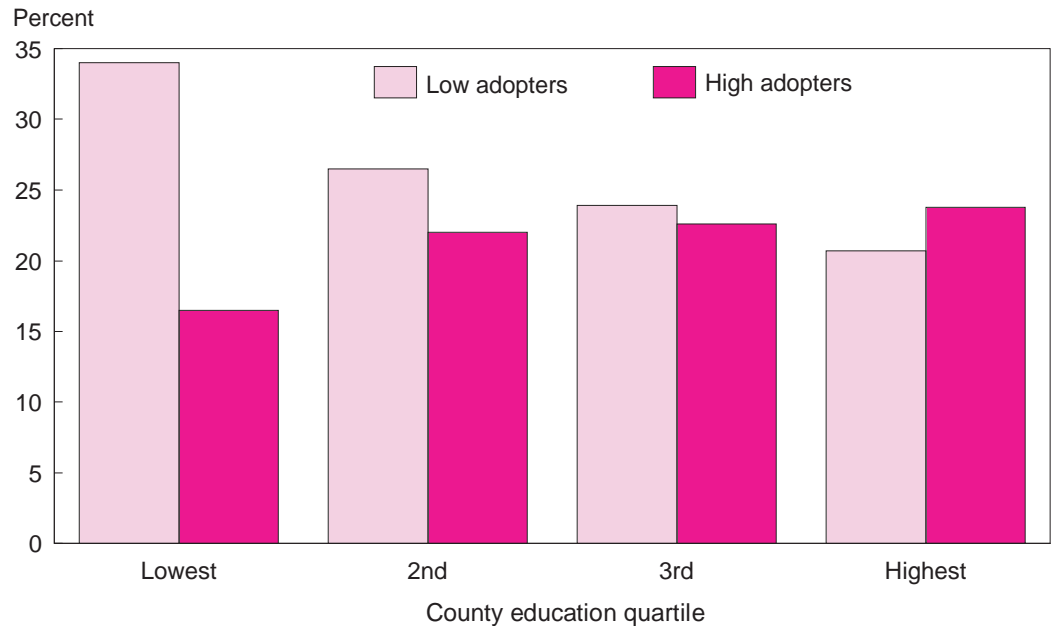
Source: Calculated by ERS using data from the Rural Manufacturing Survey.

Figure 3  
**Nonmetro proportion of plants offering both retirement and health benefits, by technology use and education level of workforce, 1995**  
*High adopters are much more likely to offer benefits to workers at a given education level*



Source: Calculated by ERS using data from the Rural Manufacturing Survey.

Figure 4  
**Nonmetro technology use, by county high school graduation level**  
*Manufacturers in counties with low graduation rates are more likely to be low adopters of advanced technology*



Note: Education quartiles are based on rates of high school completion for adults aged 25-44 in 1990.  
 Source: Calculated by ERS using data from the Rural Manufacturing Survey and 1990 Census of Population.



Table 4

**Nonmetro manufacturing wages and benefits, by technology use and local education levels**

*High technology adopters offer higher wages and benefits than low adopters in high- and low-education counties*

Industry	Average hourly wage—			Plants providing health and retirement benefits		
	Low adopters	High adopters	Difference	Low adopters	High adopters	Difference
	Dollars			Percent		
Highest completion rates	8.25	10.15	23.0	45.8	75.2	29.4
Moderate—high	8.72	10.34	18.6	42.0	80.6	38.6
Moderate—low	7.84	9.93	26.7	25.1	79.1	54.0
Lowest completion rates	7.44	9.47	27.3	33.0	88.0	54.0

Note: Education quartiles are based on rates of high school completion for adults aged 25-44 in 1990.

Source: Calculated by ERS using data from Rural Manufacturing Survey.

High adopters are also likely to offer benefits. In counties with low high school graduation rates, high adopters are about more than twice as likely as low adopters to offer both retirement and health benefits.

**Most High Adopters Added Jobs**

Finally, we now return to the quantity side of job creation. Adopters of advanced technology appear to create “good jobs” with relatively high pay and benefits, but “good jobs” are also costly to the employer. Do advanced technology employers show a greater tendency to downsize or create relatively few jobs?

As was the case in looking at wage growth, the RMS data cannot provide conclusive evidence on this issue, since the survey was done at one point in time, and it misses plants that cut employment to less than 10 workers or that went out of business before the date of the survey in 1996. This issue was addressed by looking at reported changes in plant employment over the years 1992-95. The analysis was restricted to plants that were similar in size—those with 50-249 employees in 1992.

The data do not indicate any tendency for high adopters to downsize. In fact, nearly two-thirds of the high adopters reported job gains, a much higher proportion than among low or middle adopters (fig. 5). Low adopters were most likely to have lost jobs between 1992 and 1995. This comparison indicates that advanced technology adopters measure up well not only in job compensation, but in job “quantity” as well. The technology-job growth association does not mean that new technology adoption leads to job growth. The more competitive plants may adopt new technologies in the process of expanding their operations.

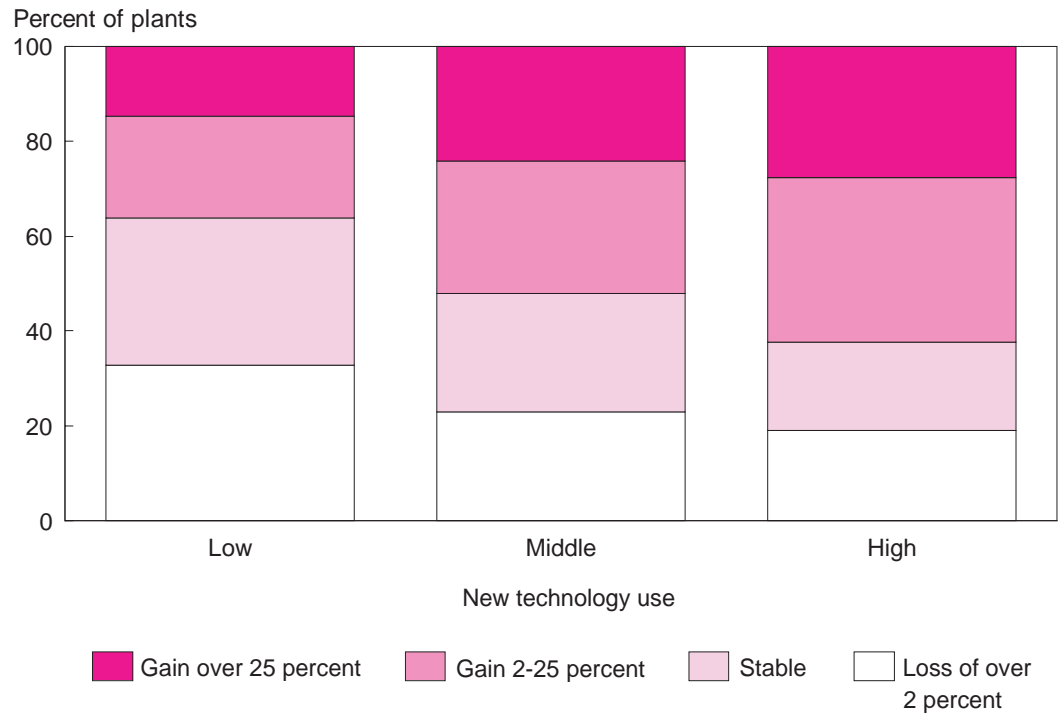
**Nurturing Technology-Intensive Manufacturing Is a Promising Development Strategy**

The superior pay and benefits associated with technology-intensive manufacturing seem to offer promising job prospects for workers with moderate skill levels that may offset to some degree the negative impacts of declining unionization. The greater prevalence of profit-sharing and training among technology-intensive companies gives workers a greater stake in company performance, and builds worker skills and productivity. Of course, advanced technology is not always beneficial to workers. Although most high technology-adopting plants surveyed by ERS added jobs during 1992-95, a significant share of them cut employment. Many workers object to the work environment in such plants, and have resisted new technologies and management practices that may call for faster production lines, group decisionmaking, greater responsibility for quality control, job rotation, and nontraditional methods of performance evaluation and compensation.

Policymakers and development officials at Federal, State, and local levels have recognized the advantages of new technology. Considerable effort is expended on manufacturing extension by the National Institute of Standards and Technology's Manufacturing Extension Partnership, and by State entities. Greater emphasis is now being given to rural areas. The results shown here suggest that these efforts have the potential to improve living standards by creating "good jobs" with relatively high wages and benefits. [David McGranahan, 202-694-5356, dmcg@econ.ag.gov]

Figure 5  
**Nonmetro manufacturing plants, by 1992-95 employment growth and technology use**

*Job growth was most common among high adopters of technology*



Note: Plants with 50-249 employees in 1992.

Source: Calculated by ERS using data from the Rural Manufacturing Survey.

### Measuring Advanced Technology Use

The 1996 Rural Manufacturing Survey (RMS, app. A, "Data Sources") asked manufacturing establishments whether they used five production technologies that are used to automate and control production processes, five new management practices that affect the way production workers do their jobs, and five telecommunications technologies. Establishments were classified as "high adopter," "medium adopter," or "low adopter," based on the number of technologies and practices they reported using. In many of the comparisons in this article, "high adopters" are compared with "low adopters" to simplify the comparisons; characteristics of "medium adopters" usually come out between the two other categories. (For more information on this topic, see Fred Gale, *Is There a Rural-Urban Technology Gap?* AIB-736-01, USDA/ERS, August 1997.)

#### Technologies and management practices

Production technologies	Management practices	Telecommunications
Computer-assisted design	Self-directed work teams	Modems
Computer-assisted engineering	Job rotation	Satellite communications
Numerically-controlled or computer-controlled machines	Employee problem-solving groups or quality circles	Internet Computer linkages outside the firm
Programmable controllers	Statistical process control	Computer linkages to other locations in the firm
Linked access network on factory floor	Total quality management	

Source: Rural Manufacturing Survey.

### Compensation and Training Questions

Does your establishment currently provide production workers with...

A pension or retirement plan?

Contributions toward an employees' group health insurance plan?

A profit-sharing or stock purchase plan?

Paid sick leave or vacation leave?

Do you currently pay for or provide formal training for production workers?

In 1995, what was the average hourly rate of pay received by production workers at your establishment?

Three years earlier, in 1992, what was the average hourly rate of pay received by production workers at your establishment?

### Results Hold Up in More Sophisticated Statistical Analysis

The author estimated the relationships between new technology use and worker compensation when all of the factors considered in this article (plus branch plant status and proportion of women among production workers). This more sophisticated analysis showed that technology use had a smaller, but still substantial, association with earnings. In a regression of the natural log of hourly earnings on technology use and other characteristics, the wage premium paid by high users compared with low users was reduced from 25 percent to 13 percent when all factors were considered simultaneously. Much of the reduction reflected the fact that, in general, larger plants both adopt more technologies and pay higher wages.

Logistic regressions showed that the difference in the prevalence of benefits between low and high new-technology-use plants was roughly 30 percent for retirement benefits, 13 percent for health benefits, 50 percent for training, and 20 percent for profit sharing when other factors were taken into account. None of these gaps are more than a third smaller than found in simple comparisons of low and high new-technology-use plants. Most of the differences in benefits found between low and high users of new technology cannot be attributed to other plant and location characteristics.

It is conceivable that factors not measured in this study may be responsible for the greater compensation in new technology plants. But, as noted above, our other research has shown that new technology manufacturers are much more likely than old technology manufacturers to report that skill requirements have risen in the past 3 years. The greater compensation in new technology plants is consistent with their higher and rising skill requirements and their need to retain newly trained workers.

## Rural Businesses May Benefit from Big Transportation Funding Increases

*Most transportation programs received big funding increases in 1998. Major transportation developments included reauthorization of highway and public transit funding programs, continued consolidations in the rail freight industry, and added funding for rural air service.*

In June 1998, the Federal-aid highway program was reauthorized, sharply increasing money for Federal-aid highways, highway safety, and transit programs. The Transportation Equity Act for the 21st Century, or TEA-21, is the single largest public works bill in U.S. history, providing \$218 billion in funding for highway and transit programs over the next 6 years (1998-2003), a 40-percent funding increase over the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), which provided funding for highways and transit for the previous 6-year period (1992-97). During 1998-2003, the bill provides \$175 billion for the Nation's most important highways, and more than \$41 billion for transit programs. In fiscal year 1999, \$28.2 billion was authorized for highway funding.

Increased transportation funding is likely to benefit the rural economy. Besides providing many jobs in nonmetro areas, the transportation industry plays a central role in rural economic development far beyond its direct impact. Investment in the transportation network provides access to jobs and services for rural residents and enhances the movement of agricultural and commercial products from rural farms and manufacturers to urban markets. A recent U.S. Department of Transportation-funded study showed that almost one-fifth of the increase in productivity in the U.S. economy between 1980 and 1991 was attributable to investment in highways (see American Association of State Highway and Transportation Officials, *Transportation and the Economy: National and State Perspectives*, May 1998).

Under TEA-21, Federal highway aid continues to be allocated to the States, with every State except Massachusetts (which was advanced funds under the previous highway legislation) receiving funding increases. On average, the annual apportioned amount received by States grows by 44 percent. Since Federal highway aid goes to States, which then decide how to use the money based on their individual priorities, it remains difficult to definitively say how future funding increases will affect rural areas. Based on previous funding patterns, nonmetro per capita funding levels are highest for counties in the West.

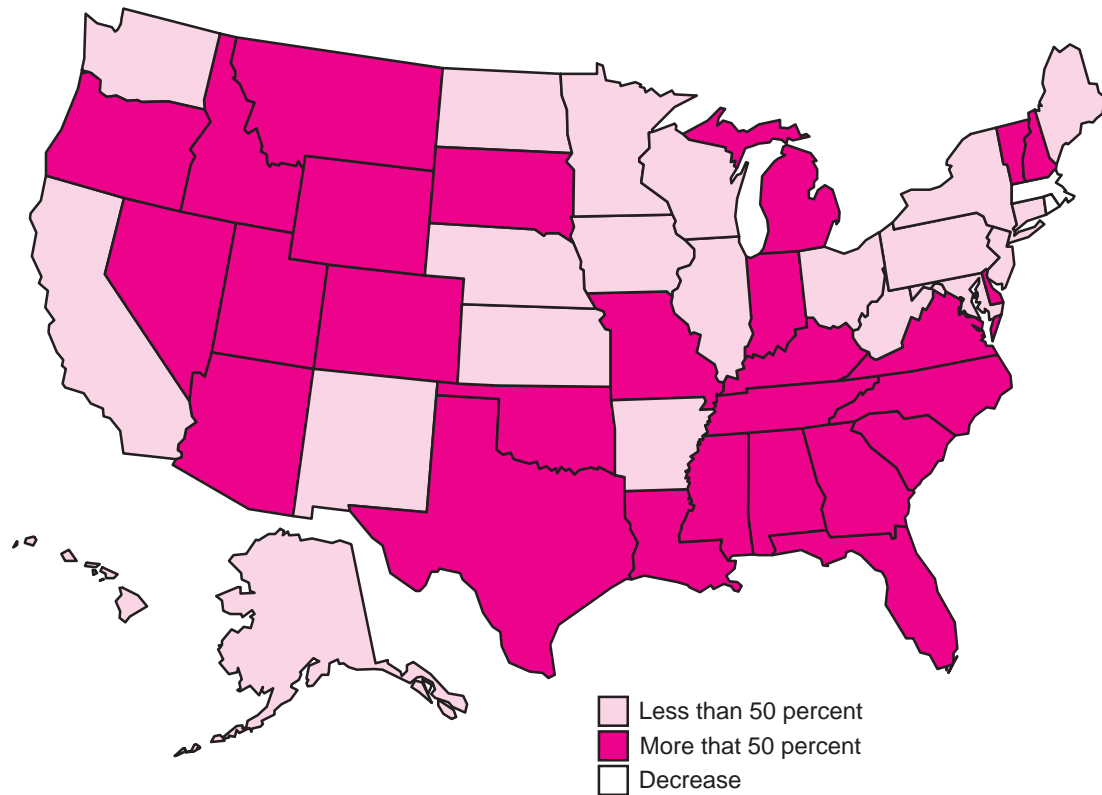
Many of the States receiving big funding increases are located in the South (fig. 1). Research indicates that rural highway spending is positively correlated with employment gains in the manufacturing sector, and manufacturing is the most important nonmetro economic activity among those States receiving large funding increases (fig. 2). Much of the Rocky Mountain West will also receive big increases, likely benefiting rural communities in that region which are highly dependent on highways, due to their remote location. Farming is the most important nonmetro economic activity in many States receiving smaller increases in aid. These States are concentrated in the Midwest, as well as in the Northeast. Most of the Midwest farming States will receive relatively small increases in aid.

TEA-21 continues aid for the smallest rural communities under the Surface Transportation Program (STP) "special rule" that targets highway funds to areas with populations less than 5,000. Although this is an important source of funding for some rural areas, it fails to take into account that many rural communities have populations greater than 5,000, and are therefore ineligible for funding under this set-aside.

TEA-21 provides a total of \$2.25 billion during 1999-2003 for the Appalachian Development Highway system, a program that is designed to provide aid for the construction of highways and access roads in Appalachia. Funding for this program may benefit rural industries located in Appalachia, such as mining and manufacturing, as well as tourism, recreation and service industries. The new legislation also provides \$148 million for the National Scenic Byways Program, which offers technical assistance and grants to States for the development of recreational use roads, which are located primarily in rural areas.

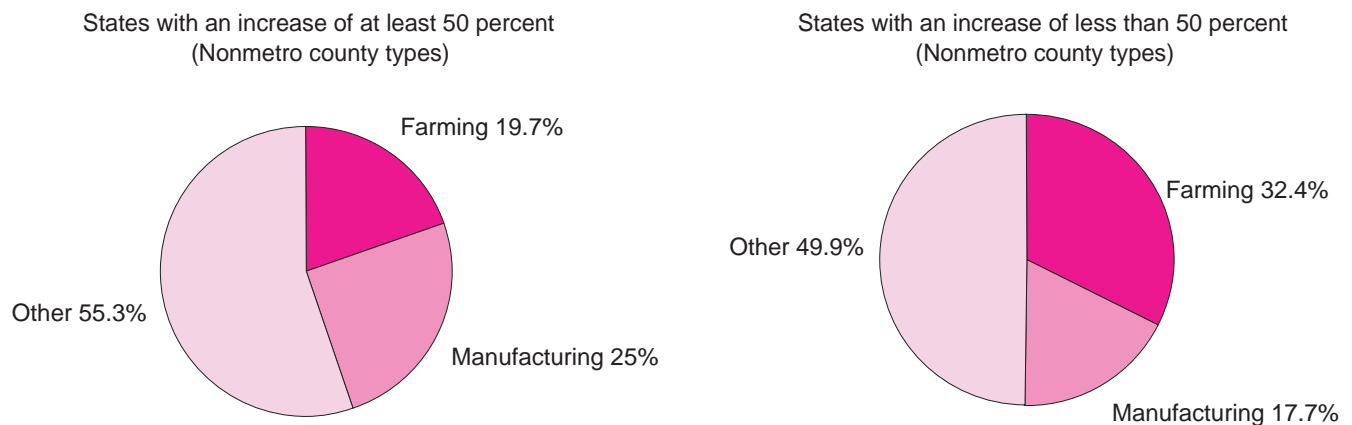
TEA-21 continues to fund "transportation enhancement" (TE) activities (environmental, recreational, and general development activities) through a 10-percent set-aside from STP

Figure 1  
**Percent change in State transportation funding under TEA-21 versus ISTEA**  
*States in the South and Rocky Mountain West receive highest funding increases*



Source: Senate Environment and Public Works Committee.

Figure 2  
**Nonmetro county types by State-level changes in highway funding under TEA-21, 1998-2003**  
*States with the largest funding increases have a larger share of manufacturing counties and fewer farming counties*



Source: Calculated by ERS using data from U.S. Bureau of the Census.

funds. Some have argued that TE funding takes scarce resources away from rural (and urban) highway needs by using money for programs other than roads and bridges. Others contend that enhancements are important for rural businesses, and that greater flexibility is needed in allowing their use for a wider variety of economic development projects. TEA-21 allows a State to transfer a portion of its TE funds to other programs.

### **Rural Transit Programs Receive Record Funding**

In recent years, lack of public transportation has emerged as an important issue for rural areas. For many rural households, lack of transportation limits access to employment opportunities and health and child care, and reduces the choices available when shopping for food and other items. Labor shortages have been increasingly common in hospitality, food service, and other industries in close proximity to rural areas with surplus labor, and there has been increased pressure to find jobs for welfare recipients with welfare-to-work legislation. These factors have combined to bring attention to public transportation needs in rural areas.

Under TEA-21, rural transit's share of funds available under the Nation's transit funding formula increased 16 percent in 1998. The new legislation also increases the main rural transit program's (section 5311) fiscal year 1999 funding 32 percent over 1998 levels to nearly \$180 million, which is nearly double the increase received by urban transit programs. For the first time in the program's history, these funding increases are guaranteed or "walled-off," assuring transit an estimated 80-percent return on authorized funding levels (in contrast, highways have traditionally received nearly 100 percent of authorizations). These funding increases will likely benefit rural residents who rely on transit as a means of getting to and from medical appointments, child care facilities, and jobs. In particular, rural businesses, such as those in the service industry, that rely on public transit as a source of transportation for their workers will likely benefit. Nonmetro service-dependent counties are found throughout the Nation, with significant clusters located in parts of the West and the Midwest.

The new legislation also provides \$44.7 million for the Rural Transportation Accessibility Incentive Program, which supports "over-the-road" bus service. This program is designed to help bus operators finance capital and training costs associated with complying with U.S. Department of Transportation regulations on intercity bus service. Funding for this program is to be distributed through a competitive grant selection process.

New under TEA-21 is the Access to Jobs program, which will provide \$150 million in 1999 for transportation programs that offer access to jobs. Under this program, 20 percent of program funds (\$30 million) is reserved for rural areas (with populations less than 50,000). Important considerations in allocating funds include the number of welfare recipients in the target area, the extent to which applicants demonstrate coordination with existing public and human services transit agencies, and the degree of innovativeness of specific approaches. Rural areas with large numbers of service-dependent industries, in particular, may benefit from this program.

### **Railroad Industry Continues To Consolidate**

Disruptions of rail service due to railroad consolidations have become an item of concern for the Nation's farm and business communities. Much of the Nation's bulk commodities and manufactured goods are moved by rail. Traffic flows along the Nation's rail network were severely disrupted in mid-1997 and 1998 when the Nation's largest freight rail company, Union Pacific, continued to absorb operations of the Southern Pacific railroad, with which it merged in 1996. Although the long-term economic effects of consolidations in the rail freight industry remain unclear, severe short-term disruptions have occurred as congestion on rail routes initially centered in Texas quickly spread to other States. Among the industries most negatively affected have been chemicals and automobiles, as well as most bulk commodities. Changing trade flows due to NAFTA (the North American Free Trade Agreement) have also created transportation bottlenecks along the U.S.-Mexico border, which has disrupted rail service, prompting Congress to provide \$700 million for border projects and major road corridors for north-south trade. As shippers have attempt-

ed to shift to other transportation modes, many trucking operations have been unable to keep up with the growing demand for their services, further tying up the Nation's rural transportation freight network.

In mid-1998, the Surface Transportation Board (STB), the Federal agency that oversees all mergers in the rail freight industry, approved the purchase of the Consolidated Rail Corporation (commonly referred to as Conrail) by Norfolk Southern and CSX railroads. This occurred despite rail traffic disruptions that resulted from the Union Pacific-Southern Pacific merger, and despite concerns about lack of competition in grain transport arising from the 1995 merger of the Burlington Northern and Santa Fe lines. The Conrail breakup is not expected to significantly hurt competition in rail service because bulk commodities, with the exception of coal, have not traditionally moved in large volume on Conrail's routes. Water and truck shipments compete on some Conrail routes, and past mergers have shown that these transportation modes when used together can provide effective long-haul competition for rail service. The absorption of Conrail by CSX and Norfolk Southern may also retain competition in some key markets, and add to it in others.

To avoid traffic disruptions like those that followed the Union Pacific merger with Southern Pacific, the STB will closely monitor the situation, maintaining weekly reports on rail congestion in former Conrail railyards. The STB also has frozen shipping rates for 3 years for some shippers and has taken steps to ensure that some smaller lines do not lose access to the new network. These provisions may provide some relief to agricultural and other bulk commodity shippers.

Continuing consolidations in the rail freight industry have added to the fortunes of "small railroads" (railroads with 1995 annual revenues less than \$255.9 million). The establishment of a small railroad in a local area, a strategy that became increasingly popular after the railroad industry was deregulated in 1980, has provided a number of rural areas with a mechanism to prevent some of the negative effects of mergers, while ensuring that smaller communities continue to be served by rail service in the face of what would otherwise have been a rail abandonment. For some areas, this can be a useful option, since recent evidence indicates that one in six rural manufacturers located in the most rural counties perceive that lack of access to rail lines is a significant problem affecting their ability to compete (see David McGranahan, *Local Problems Facing Manufacturers*, USDA/ERS, AIB-736-03, March 1998). Since deregulation, numerous small railroads have been expanded or established on routes that were either abandoned or faced abandonment, with such small railroads growing nationally in size from 18,255 miles in 1980 to 45,300 miles in 1995.

Federal funding for the establishment of small railroads is available through the U.S. Department of Transportation's Local Rail Freight Assistance program. Program funds have been used in the past to conduct rail planning activities, acquire railroads, and rehabilitate existing rail facilities, although no new funding was made available in fiscal year 1998. The program continues to operate on carryover funds.

### **Passenger Rail Service Gets Added Boost**

In the fall of 1997, the Nation's passenger rail network received a 5-year, \$2.2-billion subsidy for capital improvements (to be used for upgrading track, signals, and other capital stock), which reflects Congress's objective to have Amtrak subsidy-free by 2002. The current (fiscal year 1999) Department of Transportation appropriations legislation provides no separate authorization for ongoing maintenance expenses on Amtrak's network, but provisions allow these expenses to be met through capital accounts. While the impact of added capital funding on the long-term state of the Nation's rural passenger rail network is still unclear, specific nonmetro industries that rely on passenger rail service as a source of transportation for their workers and customers, such as the tourism and service industries, may benefit. Also positively affected may be low-income residents, the elderly, and persons with disabilities, since Amtrak represents one of the few viable transportation



options for nonmetro residents without access to automobiles. However, relatively few nonmetro communities have Amtrak service.

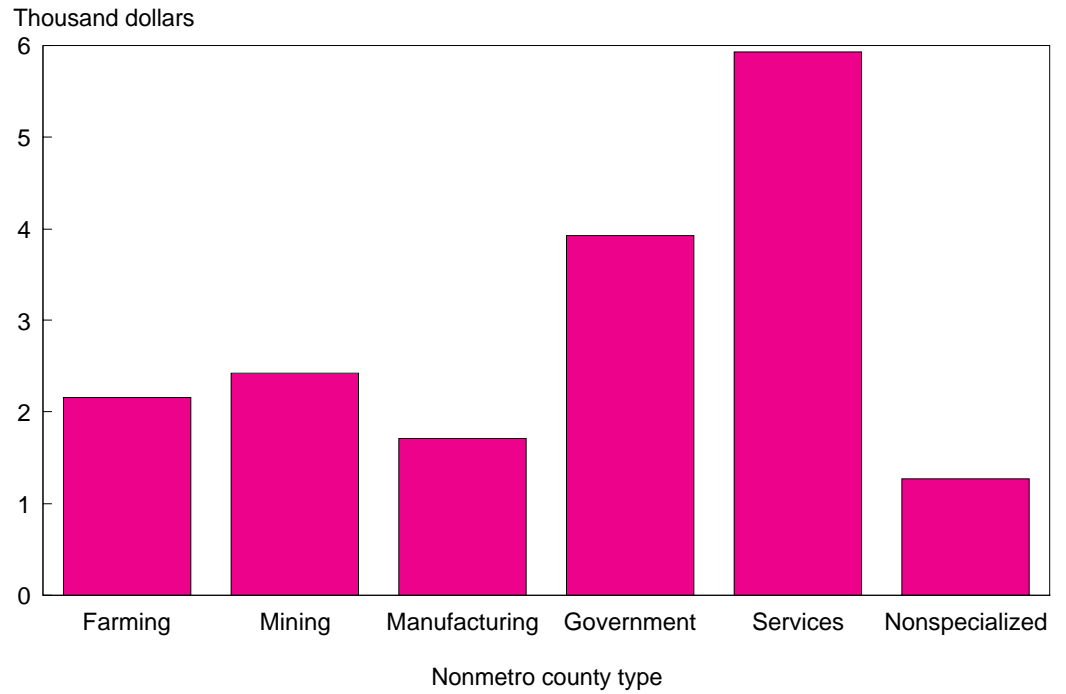
Some rural businesses may benefit from the recent establishment of freight shipment services along some of Amtrak's routes. Designed to provide a new source of revenue to the quasi-public passenger rail service agency, isolated rural businesses that require rapid shipment of small packages but lacking adequate air freight facilities may benefit from this new service (if near communities that have Amtrak service).

### **Rural Air Service Benefits from Funding Increases**

Rural air service may get a boost with the aviation bill, which is up for reauthorization in 1999. Legislators remain concerned about the level of concentration in the airline industry among a few major carriers, which may have resulted in higher ticket prices in some markets. In an attempt to deal with these competitive concerns, provisions have been inserted into the reauthorization legislation which are designed to increase air service to rural areas, although details are still being worked out (as of this writing). Rural areas may also be affected by the recent tightening of safety and maintenance standards on commuter aircraft that serve 10 or more passengers. Recent evidence indicates that rural air service remains an important factor in attracting and retaining business for nonmetro communities, especially manufacturing and high-tech businesses. More stringent safety standards may result in a loss of air service for some small communities as costs associated with operating commuter air service increase in some rural areas.

The \$1.7-billion (1998) Airport Improvement Program, which provides grants for airport capital projects, such as runway repaving, control tower improvements, and aviation safety projects, received a 16-percent increase in funding for 1998. This increase may prove beneficial to a variety of nonmetro businesses that rely on air service, including those in the service industry. Nonmetro services-dependent counties, which are located throughout the Nation, with clusters in the West and Midwest, received the highest per capita funding for this program (fig. 3). The \$50-million (1998) Essential Air Services program, which funds air service for small communities that lost it after deregulation, received a nearly 100-percent funding increase in 1998. The increase was attributable to the development of new funding sources for this program, which provided for a more stable revenue stream. This program mostly benefits a small number of rural communities mainly in the Midwest, the Rocky Mountain States, and Alaska. [Dennis Brown, 202-694-5338, [dennisb@econ.ag.gov](mailto:dennisb@econ.ag.gov)]

Figure 3  
**Per capita grants for Airport Improvement Program, fiscal year 1996**  
*Services-dependent counties get the most aid*



Source: Calculated by ERS using Federal Funds data from U.S. Bureau of the Census.

## Electric Utility Industry Restructuring: Issues for Rural America

*Congress is considering several proposals to restructure the electric utility industry that could lower the costs of generating electricity as new less costly and more efficient capacity is added to the generation mix, reducing the average cost of producing electricity. Until now, most of the restructuring has been at the State level as States have moved forward with restructuring legislation. Moreover, States will continue to play a vital role because most regulation of the industry is at State and local levels. Restructuring also would reduce regional differences in electric rates by stimulating creation of larger regional markets for electricity. Rural households, farms, and businesses are concerned about a number of issues, including universal access, regional differences in energy costs, stranded investments, and taxation, that will determine how they fare under restructuring.*

**R**estructuring the U.S. electric utility industry is expected to bring about a general decline in electricity rates for retail consumers as competitive markets pressure power suppliers to reduce their costs. Competitive markets also could result in service options specially tailored to the needs of particular customers. But, the overall picture may mask potential differences across geographic regions, economic sectors, electric utilities, businesses, and consumers. As has been the case in other industries, restructuring is expected to benefit U.S. economic performance as a whole, but there will be both winners and losers.

After restructuring, retail consumers will be able to buy the lowest cost electricity available from wholesale marketers (either electric power generating companies or power marketing companies). The power would then be delivered to consumers over the wires of their electric distribution company. Prices are expected to fall in some regions due to competition among marketers because electricity will be bid away from low-cost regions and because the marginal costs of producing power are below the average embedded costs in most regions. Although electric rates could rise in regions that currently enjoy the lowest electric rates, rates for most consumers are expected to fall.

### **State Actions Have Been the Focus of Restructuring Efforts**

The wholesale market for electric power was restructured by the Federal Energy Policy Act of 1992 (EPACT), which authorized the Federal Energy Regulatory Commission (FERC) to implement a competitive market in wholesale electric power among utilities. As a result of EPACT, wholesale customers can now purchase electricity on spot or futures markets, but retail distribution and sales remain under the jurisdiction of State public utility commissions.

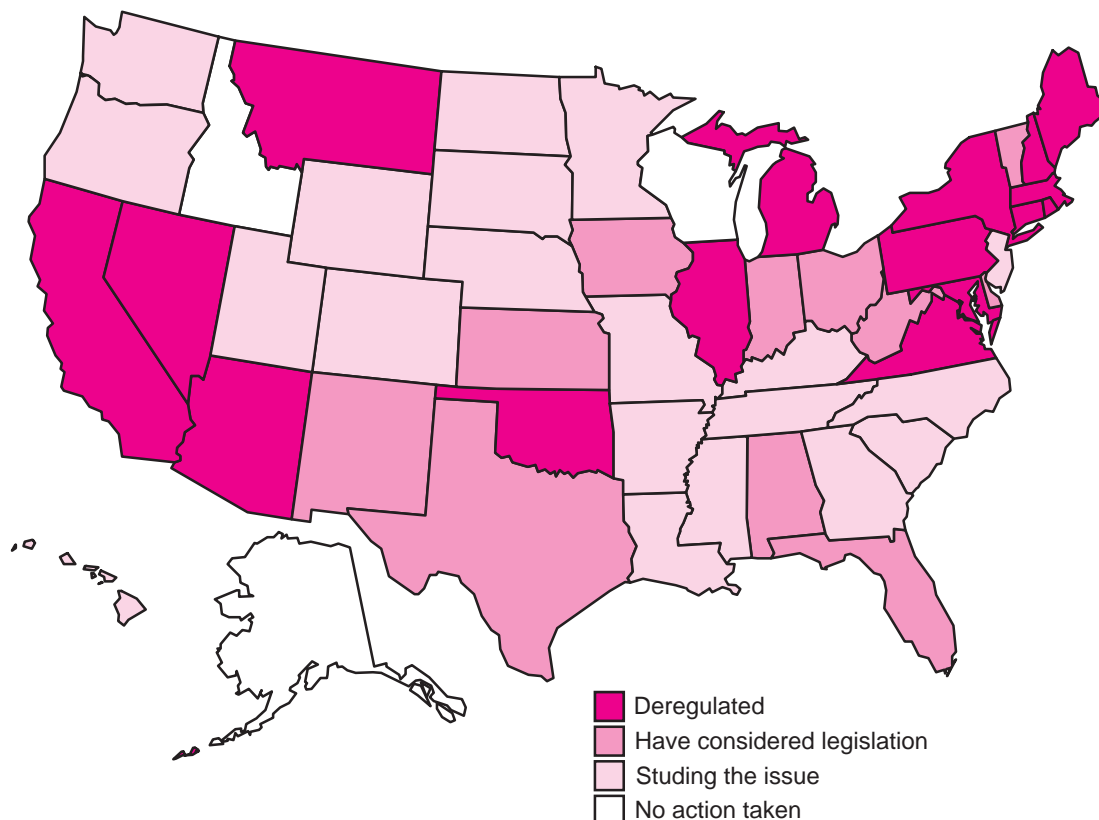
Congress is considering legislation that would further restructure electric utilities. A comprehensive approach typically addresses three separate components: (1) provisions for retail competition with consumer choice of electric power provider (but the retail distribution of power remains regulated), (2) reform of section 210 of the 1978 Public Utilities Regulatory Policy Act (PURPA) that now provides co-generators and small power producers a guaranteed market for their power, and (3) reform of the Public Utilities Holding Company Act (PUHCA) regulating financial transactions of large holding companies that hold ownership in public utility companies.

Congress has considered several comprehensive legislative proposals that set deadlines for the beginning of retail competition ranging from January 1, 1999, to December 15, 2003. The Clinton Administration has proposed legislation as well, but Congress did not act on any of these bills in its 1997-98 sessions. Similar legislation may be introduced in the 106th Congress, although the timing of Federal legislation, if it occurs, cannot be predicted.

Thus far, State actions, both legislative and regulatory, have been the focus of restructuring efforts. To date, 12 States have passed restructuring legislation, and 4 have implemented restructuring on the basis of public service commission regulatory action. Another 12 States are considering legislation or reconsidering bills that failed to pass previously. Nineteen States are studying restructuring, either by the legislature or by the public service commission. Only three States have taken no action at this time (fig. 1).

Legislation enacted differs from State to State. If the dimensions of prospective Federal restructuring legislation become clearly defined, State legislative efforts will focus on addressing State responsibilities outlined in that Federal legislation. But in the meantime, several States are aggressively developing regulatory frameworks for retail restructuring. Other States have chosen to take a more measured approach, hoping to learn from the experiences of States that took actions early.

Figure 1

**Status of State action on electric utility deregulation, 1998***Northeastern and Southwestern States have been the first to deregulate*

Source: *Energy*, Wall Street Journal Reports, *Wall Street Journal*, September 14, 1998; U.S. Department of Energy, Energy Information Administration.

Electric rates vary from State to State due to differences in the availability of energy sources, cost and efficiency of generating facilities, and taxation (fig. 2). However, differences in distribution costs are also important determinants of electric rates across States. Within a particular State, rural customers typically pay more for electricity than do urban customers, but many of the low-cost States are largely rural. States that currently have low-cost electricity are concerned that restructuring may deprive them of an important selling point in attracting business. After restructuring, businesses will be able to simply buy low-cost electricity from broader regional markets and have it delivered to them by their distribution company. Restructuring will build upon competitive pricing for wholesale power and provide consumers with a choice in accessing wholesale power, but it will continue regulated pricing for high voltage transmission and retail distribution of electricity.

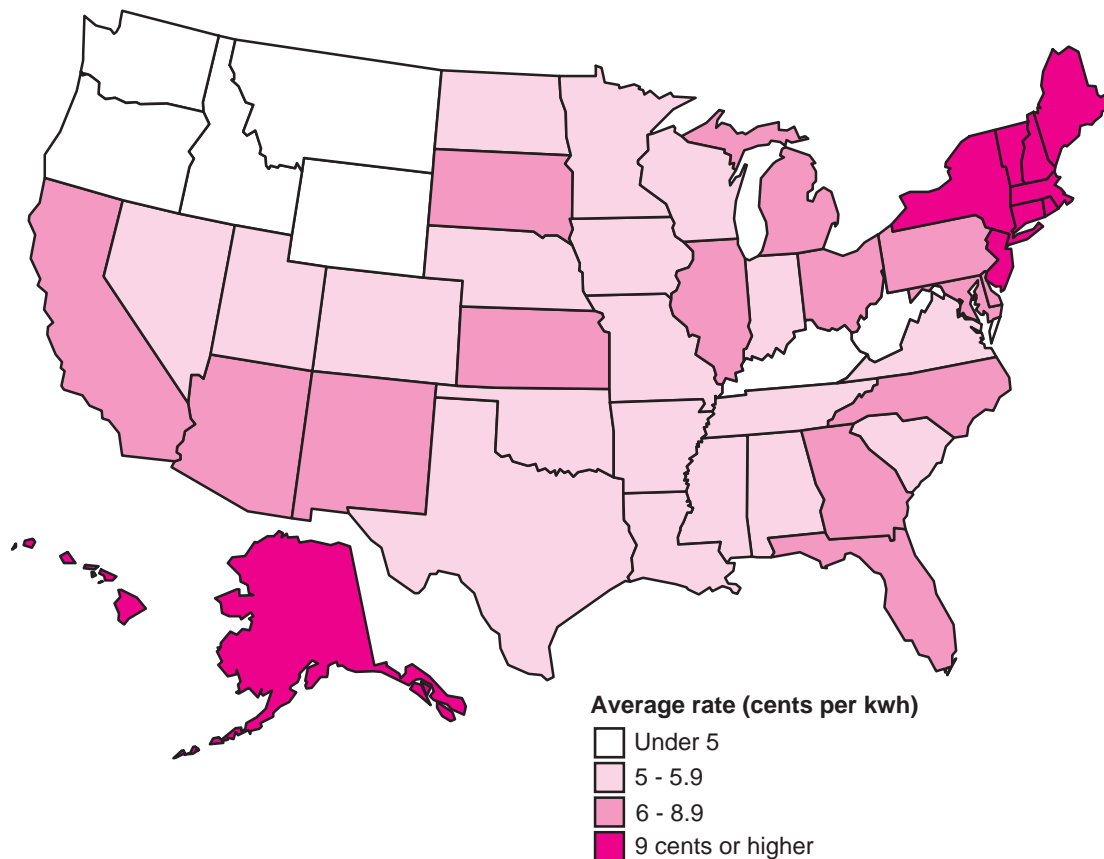
### **Rural Electric Cooperatives Play an Important Role in Providing Rural Service**

Electric service arrived relatively late in rural areas, aided by the 1936 Rural Electrification Act (REA), which provided low-cost loans to provide wiring and to help rural homes and farms acquire electrical and plumbing appliances and equipment. Before the REA, electric utilities had largely concluded that extending service to rural households was not cost effective. At the time, no one foresaw how dramatically access to electricity would change rural lifestyles.

As a means of extending electric service into rural areas, rural electric cooperatives (REC's) were formed in most States to build and operate cooperatively owned electric utilities focused

Figure 2  
**Estimated average electric utility revenue per kilowatthour, by State, 1998**

*Electric rates are highest in the Northeast, lowest in the Northwest*



Source: U.S. Department of Energy, Energy Information Administration.

on serving rural areas. These cooperatives, still relied upon in many rural areas today, have been instrumental in electrifying rural America and in supporting a revolution in rural living. Rural households use electricity for the same purposes that urban households do—heating, cooling, cooking, lighting. They also use electricity in operation of the farm business—pumping water, milking cows, powering irrigation systems, cooling and heating livestock facilities, and preparing livestock feedstuffs. Electricity costs, as a proportion of the direct cost of farm production in commercial farms, range from less than 2 percent on 476,000 farms, 2 to 4 percent on 385,000 farms, 4 to 6 percent on 121,000 farms, 6 to 10 percent on 77,000 farms, to more than 10 percent on 43,000 farms, depending on the type of agriculture involved (from USDA Agricultural Resource Management Survey data). Electricity accounts for a large share of costs in many types of manufacturing, including textiles, apparel, chemicals, stone, clay, and metal-working industries, which are important rural employers (table 1).

REC's are important providers of electric services to rural customers, but they account for only about 7 percent of U.S. electricity sales nationally. Most of them are "wire" companies. They market and distribute power purchased primarily from generating and transmission cooperatives, which they own, and from Federal power providers, such as the Tennessee Valley Authority and the five Federal Power Marketing Administrations (PMA's). Distribution cooperatives purchase up to 40 percent of their power requirements in the wholesale spot market and about 60 percent under long-term contracts with wholesale suppliers. REC's that borrow from USDA's Rural Utility Service generate overall about 64 percent of the electric power they sell to consumers (U.S. Dept. Agr., Rural Utility Serv., 1997 *Statistical*

Table 1

**Manufacturing industries for which electricity accounts for 10 percent or more of materials costs, 1992***Electricity is an important cost component for many textile, apparel, chemical, and metal-working industries*

Industry	Electricity's share of materials costs	Number of establishments
	Percent	Number
Industrial gases	66.4	592
Yarn throwing mills	33.3	33
Alkalies and chlorine	30.8	51
Primary aluminum	30.3	41
Cement, hydraulic	22.7	218
Women's dresses	22.0	2,527
Shirts, men's and boys'	21.9	244
Girls' outerwear	20.7	155
Men's and boys' suits	18.8	93
Malleable iron foundries	18.3	24
Women's outerwear	17.9	1,816
Weaving and finishing, wool	14.1	27
Electrometal products	13.6	37
Men's and boys' trousers	13.5	173
Women's suits, coats	13.4	602
Industrial inorganic chemicals	13.2	697
Women's and children's undergarments	13.1	140
Robes and dressing gowns	13.0	36
Lime	12.8	88
Brick and structural clay tile	12.7	220
Women's blouses	12.7	951
Manufactured ice	12.5	562
Girls' dresses	12.0	189
Ordnance and accessories	11.8	72
Textile finishing plants	11.4	41
Paperboard mills	11.4	144
Mineral wool	11.4	225
Men's and boys' clothing	11.3	279
Steel foundries	10.7	288
Lace and wrap knit fabrics	10.5	98
Pressed and blown glass	10.2	450
Blast furnaces and steel mills	10.2	79
Glass containers	10.0	76
Gray iron foundries	10.0	713
All manufacturing	2.4	11,981

Source: Calculated by ERS from 1992 Census of Manufactures.

*Report, Rural Electric Borrowers*, Tables 3 and 5, Inf. Pub. 201-1, Sept. 1998). Because REC generating and transmission cooperatives are owned by REC distribution cooperatives, they could, arguably, provide some price protection to distribution cooperative members in the event electricity prices were to rise in the wholesale market above REC generation costs. Additionally, unless the PMA's change their pricing and power access arrangements, REC's, municipal utilities, and certain other institutions have preferential access to PMA power at prices that may be below competitive wholesale market prices. The level of price protection, however, may prove to be limited because a substantial

amount of electricity sold by REC distribution coops must be purchased outside of the REC system, REC generation cooperatives currently are focused on increasing their level of capitalization, and these coop customers may insist on having access to consumer choice for purchase of wholesale electric power.

### **Consumer Response to Price Changes Difficult To Predict**

Consumers probably will be offered more innovative pricing schedules after restructuring. Rates may vary more, depending on the time of day electricity is used and whether a customer requires a guaranteed or interruptible power supply. This time-of-use pricing sets prices nearer to actual marginal costs, and encourages customers to shift usage to off-peak hours. (Time-of-day pricing can also be used under regulated pricing.) Electric power may be marketed to consumers as part of a package of services that includes telephone, cable TV, Internet, and home security protection. Time-of-use pricing, marketing, and packaging of services make predicting how consumers will respond to price changes more difficult, but customers will probably be more price responsive under competitive pricing.

Consumers are likely to adjust their energy use in response to changes in electricity rates resulting from restructuring. For example, lower electric rates would encourage more rural households to heat and cook with electricity rather than oil or propane. If restructuring pushes up rural rates, power for crop irrigation could shift from electricity to fuel oil or natural gas. Natural gas, however, is more widely available to urban than to rural households and businesses. (Urban households are more likely than rural households to heat with gas, while rural households are more likely to use oil, wood, or coal.) The availability of substitutes means that the response to a given change in electricity rates may be proportionately greater in urban than in rural areas.

Restructuring would create larger regional markets for wholesale power and would tend to equalize prices between regions. Wholesale power costs in high-cost regions could decline as consumers in these regions bid electric power away from low-cost regions. Electric rates in low-cost regions could then rise. In the longer term, the addition of lower cost power generation will be the primary factor bringing down wholesale electric prices. Highly urbanized high-cost regions (the Northeast and California) stand to benefit most from electricity restructuring, while the more rural low-cost regions (the Pacific Northwest, Northern Plains, Midwest, and Mid-South) will gain less and could have higher electric rates. The investment necessary to produce and deliver a given amount of electricity to consumers, along with the efficiency of the system used, largely determines the cost of electricity to consumers. The level of State and local government taxes added to electric utility rates is also a factor. Consumers in New York State, for example, have higher electric rates, partly because of high taxes on electric utilities—which are passed on to consumers in those higher rates.

Within regions, some customers will exercise greater market power than others. A large consumer, such as a manufacturing plant, is more likely to negotiate lower rates on electric power than is a smaller consumer, such as a residential customer or farmer. Many large industrial users have already negotiated preferred rates under the regulated environment.

### **Recovery of Stranded Costs Is an Important Issue**

Under regulation, electric rates are set by regulatory authorities so that past capital investments made by electric utilities can be recovered. In a competitive restructured market, utilities will no longer be able to set rates that can assure recovery of all these “stranded costs,” estimated to be anywhere from \$50 to \$250 billion. The Federal position is that stranded costs be recovered. How stranded costs will be recovered is one of the more difficult issues to resolve regarding electricity restructuring.

Until Federal policy on electric utility deregulation is passed, State regulators will exercise the dominant role in defining stranded costs and how they can be recovered by electric utilities. Some State regulators will probably not permit the firms to recapture all their stranded costs. The importance of stranded costs differs across electric utilities and

regions of the country. Those with more hydro-power tend to have fewer stranded costs, while those with more nuclear power production tend to have more, although not always. Other factors also enter into stranded costs, such as high-cost purchase power contracts and deferred regulatory assets. Complicating the dilemma for regulators is that some utilities may have "stranded benefits"—where utilities are able to recover more than their full costs in a competitive market place.

Recently, the concept of securitizing stranded costs has emerged. In securitization, utilities sell debt instruments (such as bonds) to the public, and repayment is backed by the utilities' earnings stream and by legislative or regulatory assurance that electric rates can be raised sufficiently to assure that the bonds' principal and interest will be repaid on time. An additional monthly charge is added to retail electric bills to repay the utilities' securitized debt.

Delaying restructuring for several years is another strategy for dealing with stranded costs. Allowing utilities to amortize their investments under the old regulated pricing system reduces the magnitude of stranded costs each year restructuring is delayed. Delays arguably deny retail consumers earlier access to electric power rate reductions and do not relieve them of the burden of paying for what otherwise would be called stranded costs.

### **How Can Rural Access to Electricity Be Assured?**

Many observers worry about consumer access to electric power in a restructured marketplace. For example, would electric power distribution firms be willing to extend new power connections to individual consumers or groups of consumers remote from established power lines? Would consumers be required to pay part, or all, of the cost of the connection, as was often true with investor-owned utilities in rural settings prior to rural electric cooperatives coming into existence. Will all consumers have reasonably priced access to lifeline supplies of electric power? In a well thought out restructuring of electric utilities, these concerns should be no more worrisome than was true prior to restructuring. Distribution systems will remain under regulation. Most customers currently pay the costs of lifeline rate and universal service provisions in their current electric rates. The primary issue will be how these services will be paid for in a restructured industry.

Some public policymakers envision the need for universal service guidelines to assure access and equity under deregulation. They are concerned that distribution firms will invest their capital only where the return is the greatest (presumably in urban or suburban settings), to the neglect of rural areas and poor communities. One approach to ensuring access is to charge all consumers a monthly fee to fund provision of a limited quantity of electric services (lifeline services) to those who would otherwise be unable to afford it. Something like this is done to assure access to telephone service in rural areas.

Issues such as lifeline electric supplies for consumers, and the rules under which groups such as residents of a municipality or dairy farmers who are members of a dairy processing cooperative bid for electric power, probably will be defined somewhat differently across the various States legislating retail electric utility restructuring. National policymakers may decide to provide guidelines in Federal law that assure certain principles for market based retail competition in electric power, such as market regulation, service reliability, universal access, and lifeline electric energy supplies.

### **Deregulation May Shift Taxes Currently Built into Electric Rates**

Taxation of electric utilities under restructuring will present a challenge to State and local government taxing authorities. Electric utilities have been attractive targets for taxes at these levels of government because of their large fixed investments in many communities. State and local taxes are built into electricity rates set by regulatory authorities. For example, the high level of taxes embedded in New York electric utility rates is one reason that the State's electric rates are higher, at 11.1 cents per kilowatt hour, than the U.S. average rate of 6.9 cents per kilowatt hour.

Under a regulated market, most of these taxes were embedded in electric power charges and passed on to the consumer. Under the restructuring of electric power utilities, they



may be less effective as vehicles for taxation. For example, electric power generation firms and power brokers might sell power in a government jurisdiction, while their taxable physical assets are located elsewhere, beyond the reach of tax authorities in the State or locality where their power is sold.

If State and local tax revenues from the electric power industry are to be sustained under restructuring, different tax strategies may be needed. Tax strategies currently in place may result in lower tax revenues in some situations. [*Marvin Duncan, 202-401-0533, mduncan@oce.usda.gov*]

## Deregulation Will Not Eliminate Rural Banks

*Interstate banking and branching are accelerating consolidation of the banking industry. Rural banks and branch offices that were already owned by large urban bank holding companies or banks are caught up in this process, but many rural banks will maintain their independent status. The degree to which rural lenders and their customers will be affected by other changes sweeping the industry is less clear.*

**W**hile commercial banks today handle a declining share of the Nation's financial business, they remain critical players in rural economies. The U.S. banking industry has been evolving rapidly for at least two decades, but if anything the pace of change is accelerating. Geographic deregulation is dramatically changing the structure of the banking industry. Banks also continue to cope with interest rate and product deregulation. Additional factors, such as competition from other sources of financial services and technological innovations, further complicate the financial environment facing banks. Deregulation has largely resulted from attempts by State and Federal governments and financial regulators to help banks grow and retain their own financial health, so that they can compete effectively in an ever-changing world and promote growth in the overall economy. The consequences for both banks and the general economy are not always as intended, but there is no going back.

### Interest Rate Deregulation for Consumers Is Well Established

Interest rate deregulation during the late 1970's permitted banks and thrifts to pay higher interest rates on a variety of deposit accounts. Although paying interest on checking accounts increased banks' cost of funds, the alternative was even worse—a continued flow of deposits out of banks and thrifts to newly popular alternatives, such as money market mutual funds. Unfortunately, this interest rate deregulation contributed to the savings and loan (S&L) crisis. S&L's made long-term mortgages that were funded by short-term consumer deposits. When market conditions forced them to pay higher interest rates on deposits, the mortgages became unprofitable. The S&L's were allowed to enter new lines of business in the hope of making up for the mortgage losses, but mismanagement, excessive risk taking, and fraud exacerbated the problems in too many cases.

Interest rate deregulation is not complete for business customers of banks. Current legislative proposals would allow interest to be paid on checking accounts held by business firms. Some financial institutions provide cash management sweep accounts as a mechanism to help businesses minimize lost interest by getting around restrictions on commercial checking accounts. But for many small businesses, the prohibition on interest-earning checking accounts represents a small hidden fee.

### Large Banks Want Authority To Diversify into Other Types of Businesses

Banks offer many more financial products today than in past years, but often they must supply such products as limited brokerage services through affiliates of the bank holding company. Large banks in particular would like to go much further and gain the authority to directly provide comprehensive financial services, such as brokerage and insurance, and to take ownership positions in nonfinancial firms. Product deregulation is often couched in terms of repealing the depression era banking restrictions which separate commercial banking from insurance, investment banking, and commerce. Many people fear that banks might overextend credit to try to save troubled firms if the banks owned stock in those firms. They point to Japan's recent economic difficulties as an example of what could go wrong. Financial institutions in Japan failed to address loan repayment problems of their major industrial customers on a timely basis when the real estate used as collateral for many loans declined sharply in value.

Congress came closer than ever in 1998 to easing these restrictions, but has not yet succeeded because the regulators, banks, and insurance and brokerage firms disagree over the protections to build into the process. One stumbling block has been whether new financial services are to be provided through bank subsidiaries, or by extending the current system in which certain financial services deemed closely related to banking are sold by nonbank affiliates of the bank holding company (BHC). In the latter case, the Federal Reserve is responsible for supervising the new affiliates because it holds sway over all

BHC's, even if it does not directly regulate the associated bank(s). In the former case, the Department of Treasury gains an important role because its Office of the Comptroller of the Currency (OCC) regulates National banks, which would include most of the giant banks that are anxious to receive new financial powers.

The distinction may seem trivial and is often characterized by the media as a turf war between the Federal Reserve and the Department of Treasury. However, the huge cost associated with cleaning up the S&L disaster highlights the need for caution in removing existing restrictions. The financial world is rife with numerous examples that call for a conservative, incremental expansion of bank powers. As recently as September 1998, commercial banks, investment banks, and hedge funds announced billions of dollars in losses on their loans to Asia, Russia, and other emerging markets, and on potentially risky investments, such as foreign exchange rates and derivative contracts. New powers might bring additional opportunities for banks to make costly errors. On the other hand, the market share of commercial banks for financing large businesses has declined markedly, and U.S. banks must compete against foreign banks and other types of U.S. financial institutions that do not face the same restrictions. These facts argue in favor of at least liberalizing U.S. banking laws.

To a lesser extent, States also use financial deregulation as a development tool. Several States, such as Delaware and South Dakota, encourage BHC's to set up credit card bank affiliates. As the name suggests, credit card banks run the credit card operations for the other banks owned by the holding company. Back-room operations associated with processing credit card transactions and soliciting new accounts can create hundreds of local jobs. Delaware and South Dakota laws govern permissible loan conditions (interest rates, late fees) rather than the rules prevailing in the States where the other, more traditional banks are located. Credit card banks do not compete for local deposits or for other types of loans, so they are viewed as net job generators by their host State.

### **Large Banks Look for Acquisitions To Promote Efficiency and To Serve More Markets**

Geographic deregulation is the most active ongoing form of financial regulation and is perhaps the most emotional for the overall population since many people have observed numerous name changes on their local bank offices. This would not matter if a new name was the only change, but it is often claimed that bank behavior changes as well following a change in bank ownership, especially when the new owner is perceived as a distant "outsider" with no interest in nor knowledge of the local economy. The raw national data for the reduction in numbers of banks and growth in interstate banking and interstate and intrastate branching is quite dramatic. But, when looking at the number of separate banking competitors, the situation appears much more stable at the local level.

A couple of arguments suggest that rural economies generally need not fear bank consolidation. Antitrust enforcement helps to ensure that the number of local competitors will not decline in many rural markets. In addition, banks generally are thought to be looking more favorably upon small-business lending for several reasons. Large banks need to identify new loan markets due to the intense competition that they face in their traditional markets. New technology and methods, such as the Internet and credit scoring models (an automated method of deciding whether loan applications should be accepted), allow banks that are so inclined to expand their markets far beyond those in which they have physical bank branches. This has long been true for credit cards and residential mortgage loans and is starting to be the case for small-business lending.

Large banks that fail to make local loans may be prodded to do so when some newly available data make local lending practices more visible. Revised regulations governing the Community Reinvestment Act (CRA) require large banks to annually report the number and amount of loans made to small businesses and to small farms starting in 1996. Large banks are defined as those with more than \$250 million in assets, or belonging to BHC's with aggregate bank assets exceeding \$1 billion. The geographic detail that

accompanies the loan data makes it possible for the first time to measure some lending at the county level. Large banks that seem to make few loans in their rural markets will receive bad publicity. Their response may be similar to that observed due to mortgage loan application data collected from large urban mortgage lenders under the Home Mortgage Disclosure Act. Some banks found to reject black applicants much more often than white applicants have instituted programs to take a second, closer look before making final loan decisions.

### **Large Drop in Total Banks Overstates the Effect on the Number of Banks Serving Rural Communities**

Any concerns expressed about the meaning of bank consolidation for the structure of U.S. financial markets are ultimately related to the effect on bank customers, rather than on the banking industry itself. Economic theory suggests that most industries perform better as the numbers of competitors increase. Rivals are induced to lower their prices and to find more efficient methods of producing their products so that the firms can earn profits even while lowering prices. In the current context, better performance by banks might take the form of lower interest rates charged on loans, higher rates paid for deposits, improved customer service, new types of financial services, and using technology to lower the cost of producing financial services. While the total number of banks is dropping, the market for most financial services is local or regional, rather than national. The number of different banks serving a town or county is what really matters. Urban counties averaged 11.02 banking firms with at least one office in the county at the end of 1990, declining slightly to 10.90 banking firms by the end of 1997. But the average number of banking firms serving rural counties actually increased from 4.05 to 4.33 between 1990 and 1997.

The number of insured commercial banks declined from well over 14,000 during the early 1980's to 9,128 by the end of 1997, of which 5,108 had rural headquarters. While many banks failed during this period, the major cause for the decline in bank numbers was bank mergers, many of them between banks owned by the same holding company, with one bank and its branches becoming branches of the other bank. If all multibank holding companies were to consolidate their affiliates to a single bank per holding company, the number of banks would drop to 7,029, including 4,067 rural-based banks. This would still leave America with many more banks and other types of financial institutions than are typically found elsewhere in the world. Further, the number of banking firms serving any particular rural county would generally not be reduced by this process. The effects of consolidation primarily show up in statistics for larger areas: Metropolitan Statistical Areas, States, and the Nation.

New banks are often created in the wake of bank mergers. Some local investors and bankers see mergers as opportunities to capture customers of banks that are no longer locally owned. Trade publications present examples of bankers who leave their acquired banks to start new banks that emphasize local ownership and local decisionmaking. The number of new banks has been growing in recent years and many of them may do well. But this will not change the underlying consolidation trends since the most successful, fastest growing new banks become tempting targets as future acquisitions by other banks that wish to enter or expand in those markets.

Some BHC's are said to favor an approach in which their affiliated banks retain a relatively strong degree of local autonomy. The idea is to profitably use their employees' knowledge concerning local borrowers and local economic conditions. However, recent data on numbers of interstate branches provide convincing evidence that many banks either prefer centralized control over all banking offices or have decided that the cost savings associated with a reduction in separate bank charters outweigh any benefit of maintaining nominally independent bank affiliates.

### **Corporate Reorganizations Have Increased the Number of Interstate Branches**

As recently as 1989, there was only a handful of interstate branches. Interstate banking was common by then in the form of multibank holding companies that owned banks in

more than one State. But the 11 interstate branches represented an exception at that time. However, the situation changed rapidly. Additional exceptions resulted in 5,680 interstate branches in existence on May 31, 1997, the day prior to when a provision of the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 first officially permitted interstate branching in most States. Growth in interstate branching has been explosive since then, with 9,681 as of June 30, 1997, and 13,820 interstate branches by June 15, 1998. Does this sort of rapid change imply a new way of life for bank customers? And how could so many interstate branches exist before the Riegle Act became effective?

At a simple level, interstate branching affects many rural areas because 2,314 of the 13,280 interstate branches are in rural counties (table 1). But rural customers often may perceive few differences beyond a name change if a corporate reorganization results in the local bank branch being added to the list of interstate branches. Ownership of the bank office does not really change when a bank holding company combines banks and their branches that it controls in several States under a single bank charter, with offices in the other States now counting as interstate branches. More fundamental changes occur if the holding company takes this opportunity to apply uniform procedures and products to all bank offices.

States vary considerably with respect to the numbers of interstate branches in the State. Thanks largely to NationsBank and First Union, North Carolina banks own an amazing 5,693 of the 13,820 interstate branches (table 1). Banks in Alabama, California, Minnesota, and Ohio also control large numbers of bank branches in other States. Florida, Georgia, New York, Oregon, Pennsylvania, Virginia, and Washington have the most bank branches owned by outside banks (table 2). The large Texas banks are generally under outside control but most have been prevented by Texas law from being merged into banks in other States. Montana does not participate on either side of interstate branching.

NationsBank, recently renamed Bank of America after a merger, is a leading example of how banks expanded to new markets across the country and consolidated their operations. It has evolved over time in response to changes in legislation, regulation, and financial market structure and competition. Liberal statewide branching regulations in North

Table 1  
**Interstate bank branches, by bank headquarters State location, selected States, June 15, 1998**

*The largest number of interstate bank branches are headquartered in North Carolina*

State	Metro	Nonmetro	Total
	Number		
North Carolina	5,041	652	5,693
Ohio	1,119	384	1,503
California	1,154	251	1,405
Alabama	861	138	999
Minnesota	656	267	923
Pennsylvania	436	5	441
Missouri	151	72	223
New York	231	2	233
Virginia	216	11	227
Mississippi	70	18	88
Idaho	4	10	14
Florida	0	13	13
Oregon	6	4	10
Washington	0	4	4
<b>Total</b>	<b>11,506</b>	<b>2,314</b>	<b>13,820</b>

Note: Shows number of branches located in metro and nonmetro counties in other States that belong to banks headquartered in each State.

Source: Calculated by ERS from the Federal Reserve Board's NIC database.

Table 2

**Location of interstate bank branches, selected States, June 15, 1998***Florida and Washington State have the largest number of branches owned by out-of-State banks*

State	Metro	Nonmetro	Total
		Number	
Florida	1,542	89	1,631
Washington	833	172	1,005
Georgia	699	145	844
New York	703	119	822
Virginia	662	140	802
Pennsylvania	587	60	647
Oregon	414	126	540
Missouri	273	95	368
Idaho	88	224	312
Mississippi	58	111	169
California	87	24	111
Ohio	75	6	81
North Carolina	38	10	48
Alabama	42	1	43
Total	11,506	2,314	13,820

Note: Includes insured commercial bank branches that belong to banks headquartered outside the State. Metro or nonmetro refer to the branch's location.

Source: Calculated by ERS from the Federal Reserve Board's NIC database.

Carolina facilitated the initial growth of NationsBank and several of its local competitors. They purchased other North Carolina banks and converted them into branch offices. During the 1980's, North Carolina and several neighboring States formed a regional compact to permit bank holding companies based in one of those States to acquire banks and bank holding companies in the other States. NationsBank also acquired financial institutions in Texas. Though Texas was not party to the Southeast interstate banking compact, Federal banking regulators made an exception as part of their effort to cope with numerous bank failures at that time. The holding company for NationsBank was later able to acquire banks in many additional States after those States authorized interstate banking transactions. The Riegle-Neal Act made it possible for NationsBank (or any other bank holding company) to acquire banks in any State as of September 29, 1995.

Besides moving into new markets, NationsBank has been quite aggressive at consolidating its bank affiliates both within a given State and across States. For example, Texas and some other States previously did not permit banks to have branches. Expansion within these States was accomplished by holding company acquisitions, with each bank remaining legally separate. As host States for banks controlled by NationsBank liberalized their own branching restrictions, bank affiliates were converted to branches of one or more lead banks within the State. At one point, Texas allowed county branching, before moving to statewide branching more recently. NationsBank could then merge its Texas affiliates into a single Texas bank with many branches. A loophole known as the 30-mile exception was used to combine operations in certain neighboring States. The Riegle-Neal Act allowed wide-scale interstate branching beginning in mid-1997. Though Texas and Montana chose to opt out of interstate branching, NationsBank again used the 30-mile exception in May 1998, this time to circumvent the Texas opt-out. Texas offices became branches of a New Mexico affiliate, and then both Texas and New Mexico banking offices became branches of the NationsBank lead bank in North Carolina.

**Do Urban-Based Banks Make Enough Small Business Loans in Rural Areas?**

While this article primarily describes how geographic deregulation is changing the structure of the banking industry, interest in this topic ultimately derives from any effect of bank consolidation on the ability of rural people and businesses to obtain a comprehensive range of financial services at a reasonable cost. Adequate credit for small businesses from banks and other financial institutions is considered critical to the health of rural communities. Large banks are not going to displace community banks any time soon, but they do have a strong and growing presence in many rural markets. Is the extent of lending by urban banks to rural businesses sufficient? It is outside the scope of this paper to really answer this question. But data required by the Community Reinvestment Act can be analyzed to determine the amount of rural business and farm lending by large banks during 1996. Unfortunately, most independent rural banks are too small to file these data, and we cannot accurately compare relative lending by local banks and local offices of outside banks.

Reporting lenders made 2,331,209 small business loans worth \$142.7 billion during 1996 (table 3). Urban lenders issued 306,552 of these loans to rural borrowers in the amount of almost \$15.1 billion. Rural lenders made an additional 153,058 loans worth about \$8.0 billion to rural borrowers.

However, placing these results in perspective is not easy. Urban lenders are important players in rural markets; they made twice as many rural loans as did the rural lenders. That the

Table 3

**Loans made to small businesses and to small farms during 1996, by metro or non-metro location of lender and borrower**

*Metro lenders made twice as many nonmetro small business loans as did the included nonmetro lenders, but the numbers of farm loans were much closer*

Type of loan and location of lender	Unit	Location of borrower	
		Metro	Nonmetro
Loans to small businesses:			
Metro lenders—			
Loans	Number	1,844,871	306,552
Amount	Billion dollars	117.3	15.1
Nonmetro lenders—			
Loans	Number	26,728	153,058
Amount	Billion dollars	2.3	8.0
Loans to small farms:			
Metro lenders—			
Loans	Number	50,407	82,615
Amount	Billion dollars	3.1	4.2
Nonmetro lenders—			
Loans	Number	5,078	76,249
Amount	Billion dollars	.2	2.7

Note: Loans made by lenders headquartered in Puerto Rico or made to borrowers in Puerto Rico were excluded. Includes data from 1,869 lenders that originated at least one business loan and 1,137 lenders that reported making at least one farm loan on this database.

Source: Calculated by ERS from Community Reinvestment Act data collected by the Federal Financial Institutions Examination Council for loans originated during 1996 by commercial banks, savings and loan associations, State savings banks, and Federal savings banks that had assets over \$250 million or belonged to holding companies with aggregate assets above \$1 billion. These lenders must report each business loan made during the year of less than \$1 million and farm loans below \$500,000.

extent of rural lending by urban lenders pales in comparison to their urban lending does not necessarily signal a problem since urban markets are much larger and many urban lenders do not even have rural branches. On the other hand, these data exclude thousands of rural banks that either are independent or belong to small BHC's. The rural efforts of urban lenders might look weaker if we had more complete data. Lacking this, future analysis could try to compare reported loans to the amount of rural deposits held by these lenders.

Looking at the CRA farm loan data in a similar manner is interesting. One can argue that separating farm loans and business loans is artificial, since agriculture is just a type of business that happens to be very important in rural areas. A common argument against bank consolidation is that large urban banking firms may reject some rural loan applications because the banks lack understanding of local conditions. Supporters of bank mergers argue that large banks may make more loans because they are familiar with types of businesses that are new to rural communities. The farm data can support either assertion.

Urban lenders made more farm loans (82,615) than did the rural lenders (76,249), but not by much. Urban lenders maintained a wider margin in the amount of rural farm loans, with initial face values of \$4.2 billion versus \$2.7 billion for rural lenders. Does its relatively smaller market share for farm loans and larger average loan size represent a conscious effort by urban banks to avoid lending to local farmers? Or were urban banks filling a gap by concentrating on loans for purposes other than farming that were not being handled by their rural competitors?

Many of the rural banks that reported CRA loan data hold less than \$250 million in assets and therefore filed the reports only because they belong to large bank holding companies. Thus, the above results probably understate the amount of rural lending by urban-based banking firms. Of the 1,869 reporting banks that made small business loans during the year, 496 were small. The latter included 272 of the 468 banks with rural headquarters.

### **Conclusion**

Most rural banking offices have not disappeared and will not disappear, unless technology advances to the point where physical branches are no longer required to facilitate financial services. In terms of the ongoing process of bank consolidation, Federal antitrust guidelines generally prohibit most mergers of banks in small rural communities. For example, regulators usually refuse applications by two banks to merge in a town served by only three financial institutions, due to the presumed reduction in competition. On the other hand, regulators would not care if all three banks were acquired by different outside banking firms, provided these firms had adequate records of serving customers in the various communities containing bank offices of those firms. That is the most debatable issue. Many local advocates are deeply skeptical as to whether outside firms maintain the previous level of community service after taking over local banks. *[Daniel Milkove, 202-694-5357, dmilkove@econ.ag.gov]*



### Data Sources

**Annual Survey of Manufactures.** The U.S. Bureau of the Census conducts this survey of a sample of manufacturing establishments each year. It is the most comprehensive source of information about U.S. manufacturing shipments, cost of materials, value added, wages, employment, and capital expenditures. The most recent published data available at time of publication was from 1995. These data are available for detailed (four-digit SIC) industries, but little or no regional detail is usually available. However, ERS has obtained special tabulations of metro and nonmetro totals for years 1989 through 1994. Nonmetro manufacturing statistics are obtained from these special tabulations.

**County Business Patterns.** The U.S. Bureau of the Census publishes an annual series, the County Business Patterns, that provides estimates of employment, establishments, and payroll by industry for each U.S. county. These data are the most comprehensive source of information on geographic patterns of employment for detailed industries. The Census Bureau does not publish data that could disclose information about the operations of individual companies or establishments. To account for these confidential data, ERS uses an enhanced County Business Patterns file (acquired from a private vendor) that imputes values for the suppressed data. Employees totally exempt from the Federal Insurance Contribution Act (farm operators and other self-employed persons, hired farm workers, most government employees, railroad workers, and domestic service workers) are not counted by County Business Patterns.

**The Rural Manufacturing Survey.** ERS, in cooperation with Washington State University, conducted a nationwide survey of rural manufacturing businesses in 1996 to evaluate problems that affect their competitiveness. The Rural Manufacturing Survey provides extensive information on 2,844 nonmetro establishments and 1,065 metro establishments with 10 or more employees representing all manufacturing industries. All statistics reported are weighted for stratification of the sample. The questions covered technology use, labor skills and training, marketing assistance, locational barriers to competitiveness, and sources of financing. The goal of the survey was to investigate issues of rural manufacturing competitiveness and enhance the targeting of rural development programs at national, State, and local levels.

**Macroeconomic Data.** The economic indicators used to monitor macroeconomic changes in the U.S. economy are derived from Federal sources. Measures of inflation, including the consumer and producer prices indexes, productivity, employment cost, and employment and unemployment data are developed by the U.S. Department of Labor's Bureau of Labor Statistics (BLS). Energy prices are from the Energy Information Administration, U.S. Department of Energy. National income and product account information on capital investment, gross domestic product, and net exports is produced by the Bureau of Economic Analysis (BEA), U.S. Department of Commerce. Information relating to monetary policy including changes in interest rates and foreign exchange rates, and data on industrial production are furnished by the Federal Reserve Board.

**Employment Data.** Data on metro and nonmetro employment and unemployment reported in this issue come from three sources. The monthly Current Population Survey (CPS), conducted by the Bureau of the Census for the Bureau of Labor Statistics, U.S. Department of Labor, provides detailed information on the labor force, employment, unemployment, and demographic characteristics of the metro and nonmetro population. The CPS derives estimates based on interviews of a national sample of about 47,000 households that are representative of the U.S. civilian noninstitutional population 16 years of age and over. Labor force information is based on respondents' activity during 1 week each month. Among the data products of the CPS are the monthly files, the earnings microdata files, and the March Annual Demographic Supplement (known as the March CPS).

BLS county-level employment data, the Local Area Unemployment Statistics (LAUS), are taken from unemployment insurance claims and State surveys of established payrolls which are then benchmarked to State totals from the CPS. The BLS data series provides monthly estimates of labor force, employment, and unemployment for individual counties.

BEA employment data, unlike the household data collected by the CPS and BLS, provide establishment data on the number of jobs rather than the number of workers. The BEA data are taken primarily from administrative reports filed by employers covered under unemployment insurance laws and from information from the Internal Revenue Service and the Social Security Administration. Thus, jobs and earnings for these jobs are counted at the place of work and are based on a virtual universal count rather than a sample. The BEA data provide detailed information on the number of jobs and amount of earnings by industry at the county level. A shortcoming of the BEA data is the 2-year lag between when they are collected and when they are available for analysis.

Each of these data sets has its advantages and disadvantages. The CPS furnishes detailed employment, unemployment, and demographic data for metro and nonmetro portions of the Nation. The LAUS provides less detailed employment data than the CPS, but offers very current employment and unemployment information at the county level. The BEA provides estimates of the number of jobs and earnings by industry for individual county areas. While these data sources are likely to provide different estimates of employment conditions at any point in time, they generally indicate similar trends over time.

### Definitions

**County economic types** (mutually exclusive; a county may fall into only one economic type). County typology codes are described in Peggy J. Cook and Karen L. Mizer, *The Revised ERS County Typology: An Overview*, RDRR-89, U.S. Department of Agriculture, Economic Research Service, December 1994.

*Farming-dependent*—Farming contributed a weighted annual average of 20 percent or more of total labor and proprietor income over the 3 years of 1987-89.

*Mining-dependent*—Mining contributed a weighted annual average of 15 percent or more of total labor and proprietor income over the 3 years of 1987-89.

*Manufacturing-dependent*—Manufacturing contributed a weighted annual average of 30 percent or more of total labor and proprietor income over the 3 years of 1987-89.

*Government-dependent*—Federal, State, and local government activities contributed a weighted annual average of 25 percent or more of total labor and proprietor income over the 3 years of 1987-89.

*Service-dependent*—Service activities (private and personal services, agricultural services, wholesale and retail trade, finance and insurance, real estate, transportation, and public utilities) contributed a weighted annual average of 50 percent or more of total labor and proprietor income over the 3 years of 1987-89.

*Nonspecialized*—Counties not classified as a specialized economic type over the 3 years of 1987-89.

**Input-output model.** An economic model that represents the economy as a set of sales and purchases between sectors, final demands, and payments to labor, capital, profits, and indirect business taxes.

**Metro areas.** Metropolitan Statistical Areas (MSA's), as defined by the Office of Management and Budget, include core counties containing a city of 50,000 or more people and a total area population of at least 100,000. Additional contiguous counties are included in the MSA if they are economically and socially integrated with the core county. Metro areas are divided into central cities and areas outside central cities (suburbs). Throughout this publication, "urban" and "metro" have been used interchangeably to refer to people and places within MSA's.

**Nonmetro areas.** Counties outside metro area boundaries. Throughout this publication, "rural" and "nonmetro" are used interchangeably to refer to people and places outside of MSA's.

### Regions.

Bureau of Economic Analysis regions:

*New England*—Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

*Mideast*—Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania.

*Great Lakes*—Illinois, Indiana, Michigan, Ohio, and Wisconsin.

*Plains*—Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

*Southeast*—Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.

*Southwest*—Arizona, New Mexico, Oklahoma, and Texas.

*Rocky Mountain*—Colorado, Idaho, Montana, Utah, and Wyoming.

*Far West*—Alaska, California, Hawaii, Nevada, Oregon, and Washington.

**Production workers.** Manufacturing employees engaged in fabricating, processing, assembling, inspecting, receiving, storing, handling, packing, warehousing, shipping,

maintenance, repair, janitorial and guard services, product development, and recordkeeping. Definition includes line-supervisors, but employees above that level are excluded.

**Nonproduction workers.** Other manufacturing employees, including factory supervisors above the line-supervisor level, sales, delivery, advertising, credit, collection, installation and service personnel, clerical, executive, purchasing, financing, legal, human resources, professional, and technical employees.

### Latest Trends in Nonfarm Jobs and Earnings

With the release of 1996 data by the Bureau of Economic Analysis in May 1998, we now can update the analysis of nonfarm jobs and earnings that was published in appendix 3 of the previous Rural Industry issue of *RCAT*. When BEA releases a new year of data, it also revises the previous 2 years' estimates. The data shown here do not match data for the same years published in earlier issues of *RCAT* because of the BEA revisions and because ERS has converted earlier years' earnings to 1996 dollars.

#### Jobs

Nonfarm jobs increased during 1995-96 at a somewhat slower rate in nonmetro than in metro areas, 1.5 and 2.1 percent (app. table 1). That nonmetro rate of job growth is slower than the 2.3 percent annual growth nonmetro areas averaged during 1991-96, since the 1990-91 recession ended. Metro job growth picked up in 1996 compared with its annual average growth of 1.9 percent during 1991-96.

During 1995-96, agricultural services, construction, and services industries added jobs at a faster than average rate in both nonmetro and metro areas. Retail trade; finance, insurance, and real estate; and State and local governments added jobs at slightly faster rates in nonmetro than in metro areas.

By region, job growth in the Mideast continues to lag growth in the other regions, in both nonmetro and metro areas. The Rocky Mountain region continues to lead all other regions in both areas.

#### Earnings per Nonfarm Job

Real earnings per nonfarm job increased during 1995-96, by a scant 0.1 percent in nonmetro areas and 0.8 percent in metro areas (app. table 2). The nonmetro increase was even smaller than the earnings growth nonmetro areas have averaged annually since the last recession. The metro increase in earnings per nonfarm job was up slightly in 1996 along with metro job growth.

The earnings of nonmetro jobs in agricultural services, construction, and retail trade industries, and in the Federal military did not keep up with inflation between 1995 and 1996. The other nonmetro industries averaged higher earnings in 1996, but almost all by small amounts. The fastest earnings growth in nonmetro areas was among Federal civilian jobs, followed by jobs in wholesale trade. In metro areas, jobs in finance, insurance, and real estate had the fastest earnings growth, followed by jobs in the mining industry.

Real nonfarm earnings per job fell in nonmetro areas of New England and the Far West and were flat in the nonmetro Great Lakes. In all regions, real earnings increased in metro areas and metro earnings growth exceeded nonmetro growth or grew while nonmetro earnings declined. Among nonmetro regions, earnings growth was highest in the Plains. Among metro regions, earnings growth was highest in the Rocky Mountains followed by the Plains and Southwest.

#### Trends in Earnings per Nonfarm Job, 1969-96

Nonmetro earnings have not kept pace with metro earnings since 1979 (app. table 3). Nonmetro earnings did narrow the earnings gap slightly during 1993 and 1994, but again in 1995 and 1996 metro earnings grew faster than nonmetro earnings. The gap between metro and nonmetro earnings reached \$9,204 in 1996, the widest gap so far in this data series which began in 1969. [*Linda M. Ghelfi, 202-694-5437, lghelfi@econ.ag.gov*]

## Two Methods of Measuring Farm-Linked Employment

The Economic Research Service uses two methods to measure economywide employment related to agriculture. Both methods are widely respected, and, while they provide different employment totals, both point to the continued importance of farm-related jobs in an era when direct farm employment has declined to modest levels. Both methods also recognize the wide-ranging influence of farm-related activity in the U.S. economy beyond the farm gate.

The two methods each have strengths and weaknesses. The Food and Fiber System (FFS) estimates are based on a method that explicitly models the interrelationships between various sectors of the economy. The farm and farm-related (FFR) estimates have a close relationship to the U.S. Department of Commerce's National Income and Product Accounts. The FFR estimates have the advantage of rich geographic detail that can provide valuable information about the importance of agriculture in various regions of the country.

### Farm and Farm-Related Employment

The Census Bureau's enhanced County Business Patterns data are combined with farm employment data from the Bureau of Economic Analysis to estimate farm and farm-related employment (app. tables 4 and 5). Farm and farm-related employment includes jobs not only in farm production, but also in its closely related industries—agricultural services, forestry, and fishing; agricultural inputs; and processing and marketing of agricultural goods—as well as industries peripherally related to farming—wholesale and retail trade of agricultural products and indirect agribusiness. Farm and farm-related industries are identified as industries having 50 percent or more of their national workforce employed in providing goods and services necessary to satisfy the final demand for agricultural products. An exception to this criterion is indirect agribusiness, in which percentages range between 32 and 50 percent. [Alex Majchrowicz, 202-694-5355, alexm@econ.ag.gov]

### Food and Fiber System

The Food and Fiber System (FFS) is the set of producers of goods and services required to assemble, process, and distribute raw farm products to U.S. and foreign consumers (app. table 6). FFS employment estimates are developed using a national input-output model that describes input use and factor payments for each sector of the economy. The model is used to estimate the amount of employment in each sector needed to support the final demands for agricultural products. Thus, this measure may include jobs in all sectors of the economy, even those where the link to agriculture is weak. However, unlike the FFR measure, the FFS estimates do not count all jobs in a particular sector; only the jobs needed to support demand for agricultural products are counted. The FFS measure is available at the State and national level. [William Edmondson, 202-694-5374, wedmonds@econ.ag.gov]

### **Economic Activity Triggered by Agricultural Trade**

Estimates of economic activity related to agricultural exports show that exports make an important contribution to the farm sector and to the U.S. economy as a whole (app. table 7). In 1997, the United States exported \$57.3 billion of agricultural products, down from \$60.4 billion in 1996. Exports have fallen again in 1998 and are expected to fall further to \$52 billion during fiscal year 1999 (according to an ERS forecast released in August 1998). The decline in dollar value of exports is due to falling prices for bulk commodities, large world supplies, weak global demand as a result of economic crisis in Asia, Russia, and Latin America, and a strong U.S. dollar.

Agricultural exports play an important role in the economy, supporting jobs on farms, in food processing, other manufacturing plants, and in the transportation and trade sectors. Agricultural exports generated an estimated 871,000 jobs in 1997, of which 292,000 were on farms. The impact of agricultural exports on the U.S. economy is far-reaching. Every dollar of exports generated an additional \$1.28 in economic activity in supporting sectors.

Imports of agricultural products were worth \$36.3 billion in 1997, up from \$33.6 billion in 1996. ERS forecasts a further rise in imports to \$39.5 billion in 1999. Since agricultural exports exceeded imports, the United States had a positive trade balance in agricultural products of \$21 billion in 1997. The positive agricultural trade balance will shrink in 1998 and 1999, as exports fall and imports rise. About \$9.4 billion of imports were such commodities as bananas, coffee, and tea that do not compete with U.S. products. The remaining \$26.9 billion is composed of imports, such as meat, dairy products, fruits, nuts, vegetables, sugar, and wines that compete with U.S. products.

Processed agricultural products more extensively benefit the U.S. economy than exports of bulk unprocessed commodities. Nonbulk products account for most of the economic activity generated by agricultural exports. In 1997, they accounted for 591,000 of the 871,000 jobs attributed to agricultural exports. Each dollar of nonbulk agricultural exports (fresh fruits and vegetables and "value-added" processed products) generated an additional \$1.57 in supporting activity, compared with \$0.81 for each dollar of bulk exports (grains, oilseeds, and cotton). Every \$1 billion of nonbulk exports supported 16,700 U.S. jobs, compared with 12,700 for bulk exports in 1997. [William Edmondson, 202-694-5374, [wedmonds@econ.ag.gov](mailto:wedmonds@econ.ag.gov)]

Appendix table 1—Nonfarm jobs, by industry and BEA region, 1996

Industry and region	Nonmetro	Metro	Change from previous year, 1995-96		Annual average change since recession, 1991-96	
			Nonmetro	Metro	Nonmetro	Metro
	— Thousands —		— Percent —			
Total nonfarm jobs	25,350	124,030	1.5	2.1	2.3	1.9
By industry:						
Agricultural services, forestry, fisheries, other <sup>1</sup>	479	1,404	4.1	5.9	4.0	4.7
Mining	358	522	-2.2	.1	3.1	-2.8
Construction	1,529	6,589	4.6	4.9	4.7	3.3
Manufacturing	4,419	14,812	-1.0	.4	1.4	-.1
Transportation and public utilities	1,096	6,114	1.3	2.1	1.8	1.8
Wholesale trade	855	6,158	.4	1.2	1.4	1.1
Retail trade	4,679	21,025	2.0	1.9	3.1	2.3
Finance, insurance, and real estate	1,264	10,019	2.4	2.1	2.8	1.2
Services	6,325	40,045	2.7	3.3	3.3	3.2
Government and government enterprises <sup>2</sup>	4,345	17,343	1.0	.1	1.0	.3
Federal civilian	367	2,511	-.6	-2.4	-1.1	-1.6
Federal military	388	1,857	-2.6	-1.8	-3.6	-3.4
State and local	3,590	12,975	1.5	.8	1.9	1.3
State	990	3,768	.8	-.3	1.6	1.2
Local	2,600	9,207	1.8	1.3	2.0	1.3
By BEA region:						
New England	1,135	6,993	1.4	1.7	1.7	1.5
Mideast	1,776	22,743	.6	.9	1.1	.6
Great Lakes	4,320	20,571	1.5	1.6	2.5	1.9
Plains	3,924	7,367	1.8	2.1	2.4	2.3
Southeast	8,397	27,025	1.2	2.5	2.3	2.7
Southwest	2,357	13,204	1.7	3.0	2.2	3.0
Rocky Mountain	1,550	3,600	2.7	3.5	4.1	3.9
Far West	1,890	22,527	2.1	2.6	2.4	1.2

<sup>1</sup>Other are employees of foreign embassies working in the United States.

<sup>2</sup>Government enterprises are government agencies that cover a substantial portion of their operating costs by selling goods and services to the public and that maintain their own separate accounts—for example, the Postal Service.

Source: Calculated by ERS using data from the Bureau of Economic Analysis.



## Appendix Tables

### Appendix table 2—Earnings per nonfarm job, by industry and BEA region, 1996

Industry and region	Nonmetro	Metro	Change from previous year, 1995-96		Annual average change since recession, 1991-96	
			Nonmetro	Metro	Nonmetro	Metro
	Dollars		Percent			
Earnings per nonfarm job	22,493	31,697	0.1	0.8	0.3	0.7
By industry:						
Agricultural services, forestry, fisheries, other <sup>1</sup>	13,529	16,596	-.4	0	-2.5	-1.7
Mining	38,584	48,318	.3	2.0	.4	1.9
Construction	24,450	32,996	-1.0	-.3	-.3	-.5
Manufacturing	31,180	46,110	1.0	.5	.9	1.3
Transportation and public utilities	34,813	44,299	0	.1	.3	.7
Wholesale trade	27,563	42,376	1.4	1.5	.8	.9
Retail trade	13,379	16,778	-.6	-.1	-.6	-.2
Finance, insurance, and real estate	16,826	35,373	.4	3.8	2.3	4.5
Services	18,570	29,038	.8	1.1	.9	.6
Government and government enterprises <sup>2</sup>	25,704	33,485	.5	.4	.5	.6
Federal civilian	40,026	46,787	2.0	1.3	1.6	1.6
Federal military	17,120	22,720	-.5	.1	.8	1.1
State and local	25,168	32,451	.3	.3	.2	.3
State	28,114	32,527	.7	.4	-.2	-.1
Local	24,046	32,420	.2	.3	.4	.4
By BEA region:						
New England	23,768	34,124	0	1.1	-.3	.7
Mideast	23,941	36,449	.1	1.1	-.1	1.0
Great Lakes	23,424	31,962	0	.3	.5	1.1
Plains	20,874	29,566	.4	1.2	.6	.9
Southeast	22,475	28,210	.2	.6	.5	.8
Southwest	21,108	30,029	.2	1.2	-.2	.8
Rocky Mountain	21,494	28,143	.1	1.3	.1	1.1
Far West	24,230	32,331	-.5	.7	-.3	.3

Note: Change from previous years is in real 1996 dollars. Previous years' earnings were converted to 1996 dollars using the chain-type personal consumption expenditures price index.

<sup>1</sup>Other are employees of foreign embassies working in the United States.

<sup>2</sup>Government enterprises are government agencies that cover a substantial portion of their operating costs by selling goods and services to the public and that maintain their own separate accounts—for example, the Postal Service.

Source: Calculated by ERS using data from the Bureau of Economic Analysis.

Appendix table 3—Real earnings per nonfarm job, 1969-96

Year	United States	Nonmetro	Metro	Metro-nonmetro earnings gap <sup>1</sup>	Ratio of nonmetro to metro earnings <sup>2</sup>	Change from previous year	
						Nonmetro	Metro
1996 dollars					Percent		
1969	27,087	21,580	28,249	6,669	76.4	NA	NA
1970	27,423	21,886	28,592	6,706	76.5	1.4	1.2
1971	27,900	22,330	29,090	6,759	76.8	2.0	1.7
1972	28,757	23,049	29,986	6,936	76.9	3.2	3.1
1973	28,926	23,399	30,110	6,710	77.7	1.5	.4
1974	28,187	23,055	29,287	6,231	78.7	-1.5	-2.7
1975	28,108	23,263	29,152	5,888	79.8	.9	-.5
1976	28,945	24,220	29,978	5,758	80.8	4.1	2.8
1977	29,175	24,262	30,248	5,986	80.2	.2	.9
1978	29,407	24,583	30,453	5,870	80.7	1.3	.7
1979	29,162	24,440	30,176	5,737	81.0	-.6	-.9
1980	28,486	23,742	29,493	5,751	80.5	-2.9	-2.3
1981	28,252	23,401	29,275	5,874	79.9	-1.4	-.7
1982	28,146	23,033	29,218	6,186	78.8	-1.6	-.2
1983	28,399	23,116	29,499	6,383	78.4	.4	1.0
1984	28,950	23,571	30,056	6,485	78.4	2.0	1.9
1985	29,174	23,515	30,315	6,800	77.6	-.2	.9
1986	29,419	23,413	30,611	7,198	76.5	-.4	1.0
1987	29,638	23,130	30,926	7,796	74.8	-1.2	1.0
1988	29,821	23,086	31,143	8,058	74.1	-.2	.7
1989	29,517	22,789	30,839	8,050	73.9	-1.3	-1.0
1990	29,457	22,464	30,838	8,375	72.8	-1.4	0
1991	29,175	22,207	30,567	8,360	72.6	-1.1	-.9
1992	29,977	22,589	31,471	8,883	71.8	1.7	3.0
1993	29,974	22,651	31,465	8,814	72.0	.3	0
1994	29,893	22,632	31,385	8,753	72.1	-.1	-.3
1995	29,927	22,467	31,460	8,993	71.4	-.7	.2
1996	30,135	22,493	31,697	9,204	71.0	.1	.8

Note: Earlier years' earnings were converted to 1996 dollars using the chain-type personal consumption expenditures price index.

NA = Not applicable. No previous year in the data set from which to compute change.

<sup>1</sup>Earnings gap is the number of 1996 dollars by which metro earnings per nonfarm job exceed nonmetro earnings per nonfarm job.

<sup>2</sup>Earnings ratio is the percentage nonmetro earnings per nonfarm job are of metro earnings per nonfarm job.

Source: Calculated by ERS using data from the Bureau of Economic Analysis.

## Appendix Tables

**Appendix table 4—Share of total State employment, by farm and farm-related industry, 1995**

State	Total farm and farm-related industries Jobs	Total farm and farm-related industries	Farm production, agricultural services, forestry, and fishing	Agricultural inputs	Agricultural processing and marketing	Agricultural wholesale and retail trade	Indirect agribusiness
		Percentage of total employment					
United States	22,482,634	15.2	2.4	0.3	2.2	10.0	0.4
Alabama	442,666	19.5	2.9	.4	5.2	10.4	.5
Alaska	53,168	15.1	2.9	.1	2.4	9.7	—
Arizona	294,850	13.3	1.2	.2	.6	11.2	.1
Arkansas	280,004	20.8	5.0	.6	5.4	8.9	.9
California	2,424,154	14.3	2.0	.2	2.0	9.8	.3
Colorado	342,758	14.2	1.8	.2	1.4	10.6	.2
Connecticut	218,144	11.1	.7	.1	.8	9.2	.3
Delaware	60,508	13.8	1.1	.2	2.4	9.7	.4
Florida	1,116,229	15.1	1.7	.2	1.1	11.9	.2
Georgia	737,157	17.6	1.8	.3	4.3	10.6	.6
Hawaii	112,718	15.6	1.8	.1	1.4	12.3	—
Idaho	138,813	21.3	6.5	1.0	3.1	10.3	.3
Illinois	943,491	13.8	1.7	.6	1.7	9.3	.5
Indiana	501,960	15.1	2.6	.4	1.5	10.2	.5
Iowa	408,683	23.2	7.5	1.7	3.9	9.7	.5
Kansas	299,113	18.9	5.3	.9	2.7	9.6	.4
Kentucky	416,082	20.4	5.9	.3	3.1	10.5	.5
Louisiana	331,862	15.3	2.3	.4	1.7	10.5	.5
Maine	115,678	16.8	2.4	.1	3.3	10.7	.3
Maryland	337,803	12.2	1.1	.1	1.0	9.9	.2
Massachusetts	473,169	12.5	.5	—	1.4	10.2	.4
Michigan	692,627	13.5	1.8	.2	.9	10.3	.3
Minnesota	480,032	16.0	3.9	.6	1.9	9.2	.4
Mississippi	258,764	19.2	4.4	.5	4.6	9.2	.5
Missouri	532,477	16.8	4.2	.5	2.3	9.4	.4
Montana	94,370	19.4	6.3	.6	.8	11.5	.2
Nebraska	238,913	22.0	6.6	1.6	3.9	9.7	.2
Nevada	97,110	10.6	.7	.1	.4	9.4	.1
New Hampshire	91,907	13.5	.9	.1	1.3	10.9	.4
New Jersey	529,999	12.0	.5	.1	1.6	9.3	.5
New Mexico	126,403	14.7	2.7	.1	.8	10.8	.3
New York	1,173,532	12.2	.9	.1	1.6	9.3	.3
North Carolina	863,532	19.9	2.5	.3	6.7	9.7	.6
North Dakota	97,156	23.6	9.8	1.6	2.2	10.0	—
Ohio	875,075	13.9	1.7	.2	1.1	10.4	.5
Oklahoma	301,933	17.1	5.1	.3	1.5	10.0	.2
Oregon	316,674	17.3	4.6	.4	1.5	10.5	.3
Pennsylvania	931,703	14.4	1.4	.2	2.5	10.0	.4
Rhode Island	71,181	13.3	.5	.1	1.9	10.4	.5
South Carolina	386,248	19.1	1.8	.2	5.6	10.8	.8
South Dakota	105,845	22.9	8.7	1.0	2.9	10.0	.3
Tennessee	561,103	17.9	3.3	.3	3.6	10.2	.5
Texas	1,566,266	15.0	2.8	.3	1.7	10.0	.3
Utah	152,959	13.4	1.7	.2	1.6	9.7	.3
Vermont	60,042	16.7	3.1	.2	1.6	11.5	.3
Virginia	561,633	14.6	2.0	.2	2.6	9.4	.4
Washington	500,689	16.2	3.3	.3	1.6	10.6	.4
West Virginia	121,707	14.9	3.0	.2	1.3	10.2	.2
Wisconsin	552,107	17.9	3.9	.6	2.5	10.1	.8
Wyoming	50,419	17.0	4.7	.4	.6	10.3	1.0

— = Less than 0.1 percent.

Source: Calculated by ERS using Department of Commerce data.

Appendix table 5—Share of total nonmetro employment, by farm and farm-related industry, 1995

State	Total farm and farm-related industries	Total farm and farm-related industries	Farm production, agricultural services, forestry, and fishing	Agricultural inputs	Agricultural processing and marketing	Agricultural wholesale and retail trade	Indirect agribusiness
	Jobs	Percentage of total employment					
United States	6,135,778	23.4	7.6	0.8	4.4	10.0	0.5
Alabama	188,017	29.8	6.2	.8	12.3	9.4	1.1
Alaska	33,803	18.4	4.9	.2	4.2	9.1	—
Arizona	42,375	16.5	2.4	.2	.3	13.6	.1
Arkansas	163,364	25.4	7.9	1.0	7.1	8.8	.6
California	98,799	22.0	8.0	.6	1.5	11.7	.2
Colorado	91,360	21.4	6.0	.5	1.9	12.9	.1
Connecticut	19,882	15.5	1.8	.1	2.4	10.5	.7
Delaware	18,793	29.1	3.7	.9	10.5	14.1	—
Florida	90,144	22.8	7.2	.6	1.9	12.6	.6
Georgia	288,869	25.5	5.0	.7	9.5	9.6	.8
Hawaii	38,392	22.6	5.6	.1	2.3	14.6	—
Idaho	103,115	24.8	8.8	1.3	3.5	10.7	.5
Illinois	205,786	22.1	7.8	1.5	2.7	9.6	.6
Indiana	163,526	19.3	5.9	.8	2.3	9.5	.8
Iowa	263,374	29.0	12.5	2.2	4.6	9.2	.6
Kansas	178,046	26.4	10.8	1.5	4.5	9.2	.4
Kentucky	227,823	25.3	10.2	.5	4.5	9.7	.5
Louisiana	86,955	21.0	7.2	.9	3.6	8.5	.8
Maine	64,562	17.5	3.4	.1	3.0	10.6	.4
Maryland	38,676	20.4	4.3	.4	3.4	12.0	.3
Massachusetts	7,472	15.2	2.7	.1	1.1	10.7	.6
Michigan	140,798	18.7	5.3	.3	1.1	11.6	.5
Minnesota	212,415	26.4	10.8	1.5	4.0	9.7	.4
Mississippi	195,072	22.6	6.2	.7	6.3	8.8	.6
Missouri	225,863	26.1	11.4	1.0	4.3	9.1	.3
Montana	74,221	20.5	7.8	.5	.7	11.2	.3
Nebraska	151,958	31.5	13.7	2.7	5.4	9.6	.1
Nevada	16,081	12.9	2.9	.3	.2	9.4	.1
New Hampshire	36,400	13.7	1.3	.1	1.2	10.8	.3
New Jersey	NA						
New Mexico	57,491	18.5	5.4	.2	1.0	11.3	.6
New York	116,921	17.0	4.0	.3	1.6	10.7	.3
North Carolina	328,243	27.5	5.1	.5	11.5	9.8	.7
North Dakota	64,726	30.1	16.3	2.1	2.6	9.1	—
Ohio	200,041	19.6	5.5	.7	2.4	10.2	.9
Oklahoma	149,566	24.7	11.5	.7	2.8	9.5	.2
Oregon	110,469	23.0	8.6	.7	1.9	11.4	.4
Pennsylvania	155,449	18.9	3.8	.3	3.9	10.5	.5
Rhode Island	5,967	14.2	1.1	—	.3	12.8	.1
South Carolina	127,868	25.7	3.7	.3	10.4	10.4	.9
South Dakota	75,928	26.5	12.8	1.4	3.0	9.2	.1
Tennessee	213,809	25.2	8.0	.5	7.1	8.9	.8
Texas	364,515	26.9	13.5	.9	3.3	9.0	.3
Utah	44,348	19.8	5.7	.4	2.4	10.8	.4
Vermont	41,048	17.4	3.6	.2	1.5	12.0	.2
Virginia	169,412	24.2	6.3	.5	7.5	9.2	.8
Washington	117,228	26.0	10.2	.8	2.3	11.8	.9
West Virginia	67,299	15.9	4.5	.2	1.6	9.6	.1
Wisconsin	219,897	24.9	9.1	1.3	3.3	10.4	.9
Wyoming	39,612	19.2	6.0	.5	.8	10.5	1.4

— = Less than 0.1 percent.

NA = Not applicable. New Jersey has no nonmetro counties.

Source: Calculated by ERS using Department of Commerce data.

## Appendix Tables

### Appendix table 6—The Food and Fiber System and the domestic economy, 1987-97

Item	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Employment:	Millions of jobs										
Total food and fiber	23.7	24.7	25.1	24.9	24.4	23.7	24.0	24.5	24.8	24.7	24.3
Share of domestic labor force	Percent										
	19.8	20.2	20.3	19.8	19.3	18.5	18.6	18.7	18.7	18.4	17.8
	Millions of jobs										
Farm sector	1.9	2.2	2.1	2.0	2.0	1.9	1.8	1.9	1.9	1.9	1.8
Nonfarm sectors	21.8	22.5	23.0	23.0	22.4	21.8	22.2	22.7	22.9	22.7	22.6
Food processing	1.6	1.6	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.4	1.4
Manufacturing	2.7	2.7	2.9	2.8	2.7	2.5	2.5	2.5	2.5	2.5	2.4
Transportation, trade, and retailing	8.0	8.2	8.4	8.3	8.2	8.1	8.2	8.5	8.7	8.7	8.8
Eating	6.1	6.4	6.4	6.5	6.4	6.2	6.4	6.6	6.6	6.5	6.5
All other	3.4	3.5	3.6	3.6	3.5	3.4	3.5	3.6	3.6	3.6	3.5
Total domestic economy	119.9	121.7	123.9	125.8	126.3	128.1	129.2	131.1	132.3	133.9	136.3
Value added by activity:	Billion dollars										
Total Food and Fiber	753.0	805.6	849.6	891.7	903.2	937.3	956.7	1,006.1	1,025.8	1,055.8	1,078.1
Share of domestic economy	Percent										
	16.1	16.0	15.6	15.5	15.3	15.0	14.6	14.5	14.1	13.8	13.3
	Billion dollars										
Farm sector	49.5	54.0	56.9	60.6	56.5	61.7	52.8	57.0	53.9	66.1	60.6
Nonfarm sectors	703.6	751.6	792.5	831.0	846.6	875.6	903.9	949.0	971.9	989.7	1,017.4
Food processing	92.8	98.8	105.0	110.3	113.8	116.4	120.3	123.1	123.0	118.9	124.7
Manufacturing	120.2	122.7	133.0	133.4	134.6	139.6	140.1	145.4	145.1	146.7	147.4
Transportation, trade, and retailing	240.6	257.1	265.7	278.1	280.9	286.5	294.5	308.7	320.4	326.9	338.8
Eating	102.0	109.5	112.4	119.5	120.3	121.2	128.3	134.3	136.1	136.5	139.4
All other	148.0	163.5	176.5	189.7	197.0	211.8	220.7	237.5	247.3	260.7	267.1
Total domestic economy	4,692.3	5,049.6	5,438.7	5,743.8	5,916.7	6,244.4	6,558.1	6,947.0	7,269.6	7,661.6	8,110.9

Source: Calculated by ERS from supporting ERS economic models using data from the Bureau of Economic Analysis, Bureau of Labor Statistics, and Bureau of the Census.

Appendix table 7—U.S. economic activity triggered by agricultural trade

Item	1995 total	1996 total	1997		
			Total	Bulk	Other
Billion dollars					
Economic activity generated by agricultural exports	132.9	139.9	130.8	39.9	90.9
Exports	55.8	60.4	57.3	22.0	35.3
Farm	23.4	26.1	21.5	16.9	4.6
Nonfarm <sup>1</sup>	32.4	34.3	35.8	5.1	30.7
Supporting activities	77.1	79.5	73.5	17.9	55.6
Farm	20.0	21.9	16.6	1.1	15.5
Food processing	6.3	6.7	6.2	0.1	6.1
Other manufacturing	15.5	15.5	16.2	5.1	11.1
Trade and transportation	9.8	9.7	10.9	2.9	8.0
Other services	25.5	25.6	23.6	8.8	14.8
Percent					
Nonfarm share	74	73	77	94	72
Ratio					
Multiplier of additional business activity generated by \$1 of exports	1.38	1.32	1.28	.81	1.57
Imports	30.0	33.6	36.3	1.8	34.5
Competitive	21.6	25.4	26.9	1.8	25.1
Complementary	8.4	8.2	9.4	0	9.4
Trade balance	25.8	26.8	21.0	19.6	1.4
1,000 jobs					
Employment due to exports:					
Total	895	859	871	280	591
Farm	333	292	321	120	201
Employment per billion dollars of exports	16.0	14.2	15.2	12.7	16.7
Percent					
Share of farm workforce	10	8	9	3	6
1,000 jobs					
Nonfarm	562	566	550	160	390
Food processing	84	86	90	0	90
Other manufacturing	71	70	76	20	56
Trade and transportation	200	196	175	67	108
Other services	207	214	209	73	136
Billion dollars					
Domestic equivalent of economic activity generated by competitive imports <sup>2</sup>	53.6	62.8	63.9	3.5	60.4
Net business surplus of agricultural trade <sup>3</sup>	70.9	68.9	57.1	36.0	21.1

<sup>1</sup>Includes the value of processed foods, containers and packaging, trade and transportation, and ancillary services.

<sup>2</sup>Economic activity that would have resulted had competitive imports been produced domestically.

<sup>3</sup>Total economic activity generated by agricultural exports less domestic equivalent of economic activity generated by competitive imports less complementary imports.

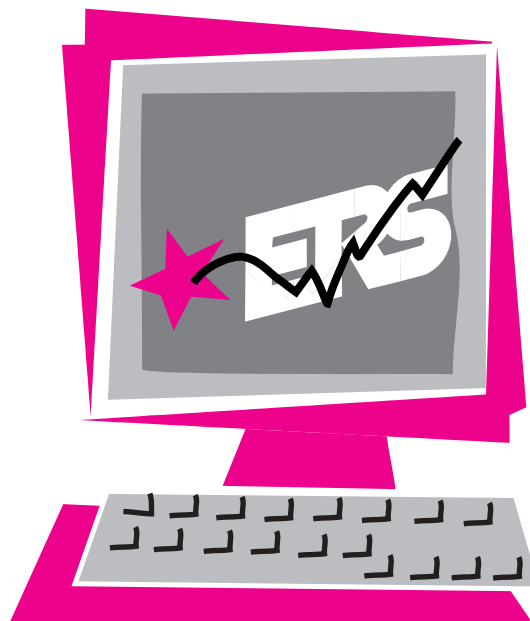
Source: Calculated by ERS from supporting ERS economic models using data from the Bureau of Economic Analysis, Bureau of Labor Statistics, and Bureau of the Census.

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