MARCH 2013

Industry Labor Productivity Trends From 2000 To 2010

Michael R. Brill and Samuel T. Rowe

Labor productivity rose for most industries during the first decade of the millennium. The expansion of information technology (IT) that fueled rapid productivity growth during the 1990s continued after 2000, and improvements in IT hardware and software, mobile telecommunications, data communications, and the growth of the internet contributed further to productivity growth. This productivity growth benefited not only producers and sellers of IT products, but also firms that used IT to improve efficiency in production and distribution.

Other factors, including a combination of cyclical and structural changes, also affected productivity growth from 2000 to 2010. In contrast to the strong output growth that contributed to productivity gains in the late 1990s, the two economic downturns during the 2000–2010 period resulted in declines or slower growth in output for many industries. As output fell, many industries reduced the number and hours of workers they employed. In some industries, hours fell more than output. The resulting job losses and continued declines or weak growth in labor hours accompanied the 2000-2010 productivity increases in many of the sectors and industries studied in this *Spotlight on Statistics*.

Labor productivity, defined as output per hour of labor input, is a measure of how efficiently labor is used in the production of goods and services. There are many possible factors affecting labor productivity growth, including changes in technology, capital investment, capacity utilization, use of intermediate inputs, including purchased services and contract labor, improved managerial skills or organization of production, and improved skills of the work force. Other factors, including increased globalization, offshoring of production, and domestic outsourcing, are also reflected in the productivity gains in some industries.

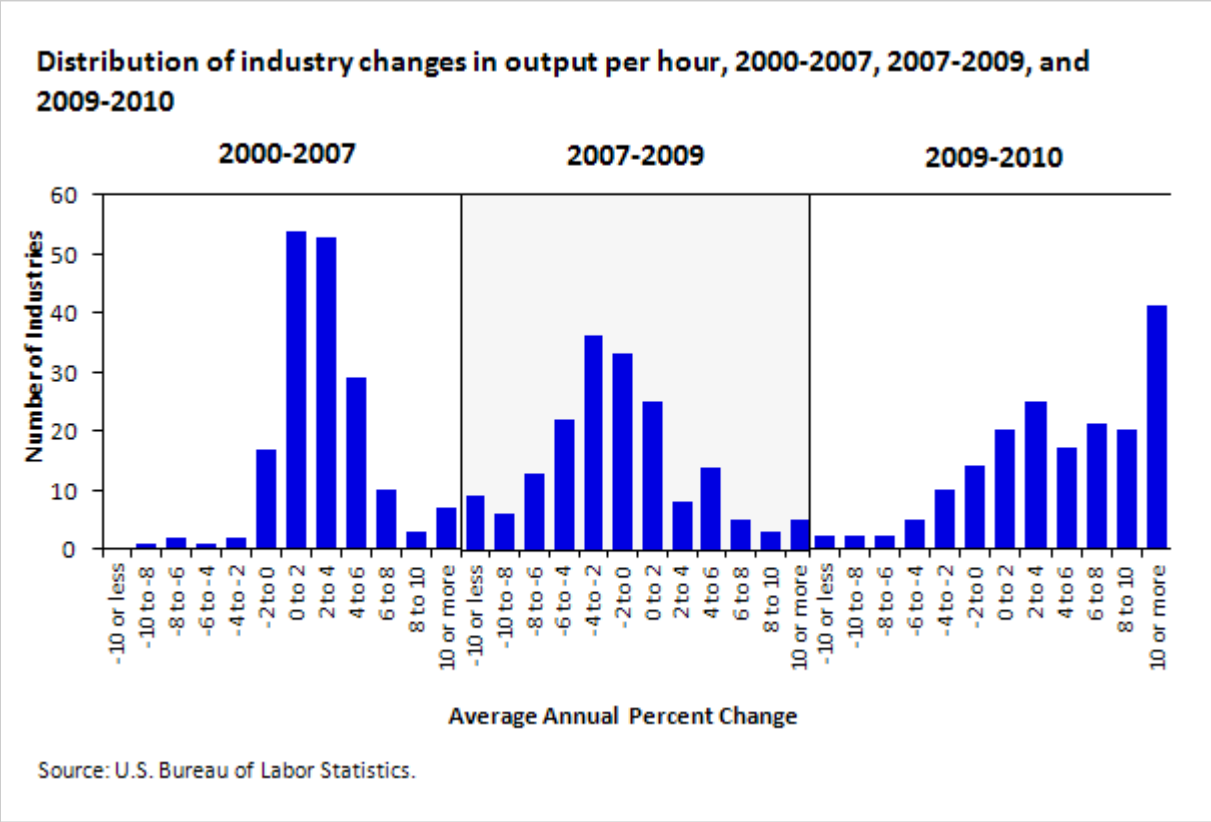
This *Spotlight on Statistics* examines BLS labor productivity trends from 2000 through 2010 for selected industries and sectors within the nonfarm business sector of the U.S. economy. These industry and sector trends provide insight into underlying shifts within the U.S. economy and the sources of aggregate productivity growth.

Business cycles and industry productivity growth

Productivity trends reflect cyclical changes as well as structural, long-term trends. Output and labor input typically increase during business cycle expansions and decline during recessions, although the magnitude and timing of output and input movements may differ—output usually falls earlier and faster than labor hours during a recession and, similarly, picks up in advance of hours during a recovery. Cyclical patterns in productivity growth, reflecting the underlying trends in output and labor hours, can be observed in individual industries and sectors as well as in the aggregate economy.

In order to better observe long-term productivity trends and minimize the effect of the business cycle on the measures, productivity growth is often measured from "peak to peak" of a business cycle. Two business cycle peaks occurred during the 2000–2010 period examined in this *Spotlight*, in March 2001 and December 2007. The corresponding annual peaks occurred in 2000 and 2007.

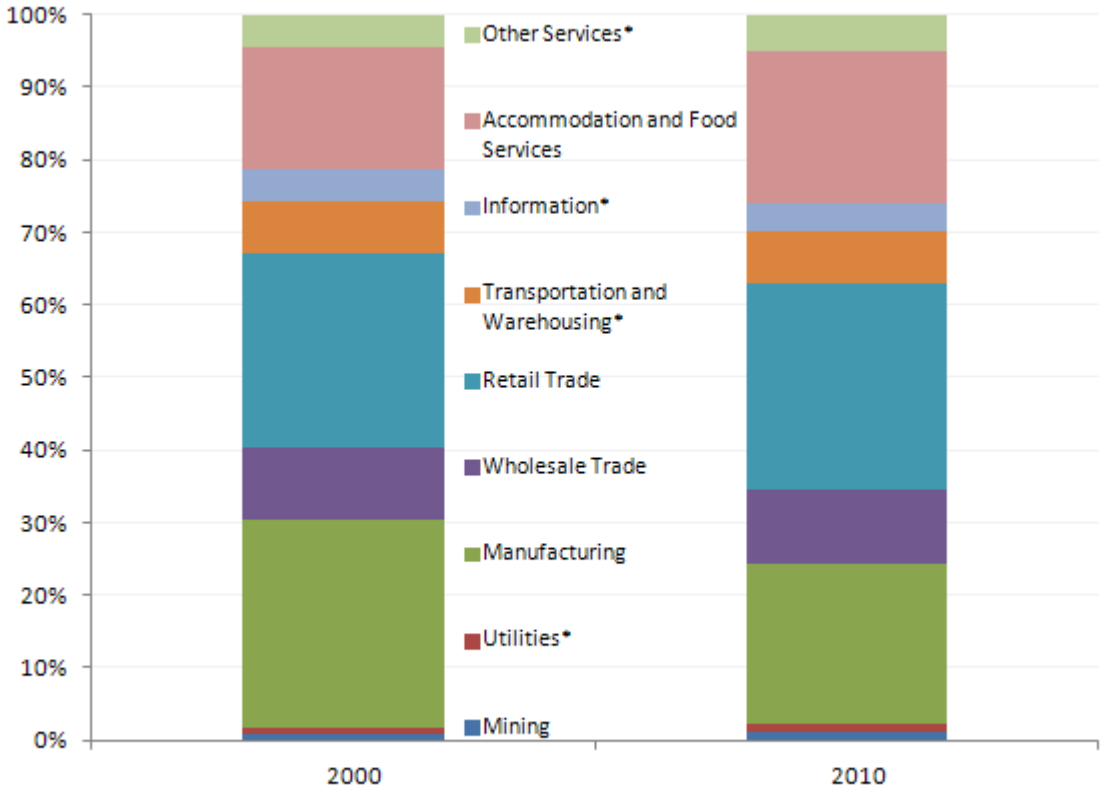
The charts below illustrate the effect of business cycles on industry productivity growth. Over the full business cycle from 2000 to 2007, productivity growth averaged between 0 and 4 percent per year in most of the industries studied. In contrast, during the recessionary period from 2007 to 2009, productivity declined in over half of the industries studied. Subsequently, many industries recorded very large increases in productivity from 2009 to 2010, the first year of the recovery.



Changes over the decade in employment shares of sectors studied

Productivity measures for a number of detailed industries and for several aggregate sectors are highlighted in this *Spotlight*. Sector measures are derived as weighted aggregates of the measures for component industries.

The charts below show how employment shares have changed over the decade among the sectors studied in this *Spotlight*. Included in the measures of employment and hours are all workers who contribute to the output of the industry, including self-employed and unpaid family workers as well as workers on establishment payrolls. As shown below, the manufacturing sector's employment share declined over the period, as the share attributable to service-providing industries expanded. The employment share of the accommodation and food services sector expanded the most among the sectors studied.

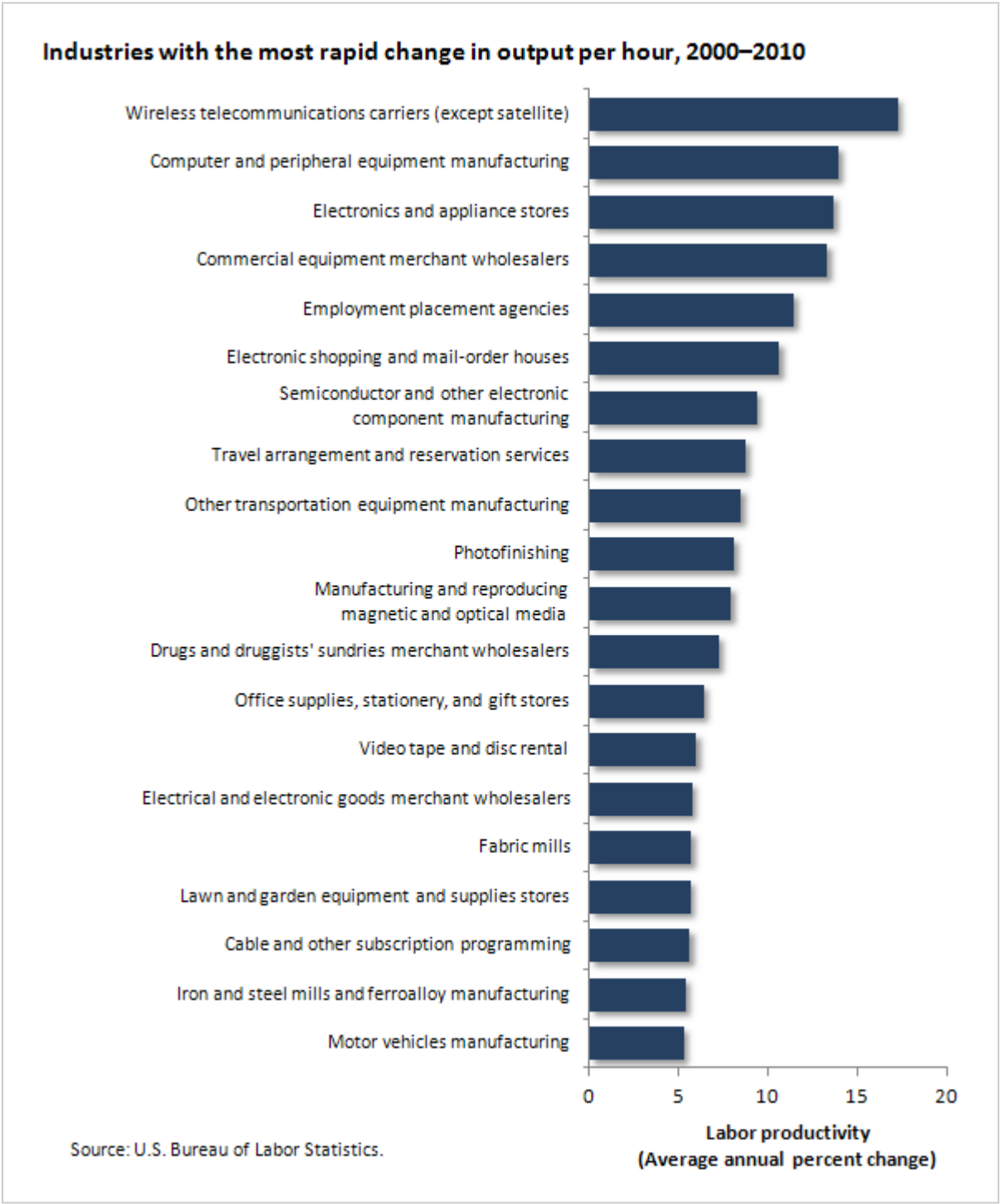


*Note: Industry coverage is significant but less than 100 percent.
Source: U.S. Bureau of Labor Statistics.

Industries with the strongest labor productivity performance

Industries that were major producers, sellers, or users of IT equipment were among the industries with the fastest productivity growth between 2000 and 2010. Of the 20 industries shown below, 15 posted increases in output over the period, while all but 2 recorded declines in hours.

For some industries, including wireless telecommunications carriers and computer and peripheral equipment manufacturing, strong productivity growth accompanied rapid output increases over the period. In other industries, such as photofinishing and video tape and disc rental stores, productivity rose despite reductions in output because labor hours were reduced even more. The structural changes that affected productivity growth in these industries also stemmed from the development of IT and the adoption of new technologies and products.


Industries with the most rapid change in output per hour, 2000–2010
Wireless telecommunications carriers (except satellite)
Computer and peripheral equipment manufacturing
Electronics and appliance stores
Commercial equipment merchant wholesalers
Employment placement agencies
Electronic shopping and mail-order houses
Semiconductor and other electronic component manufacturing
Travel arrangement and reservation services
Other transportation equipment manufacturing
Photofinishing
Manufacturing and reproducing magnetic and optical media
Drugs and druggists' sundries merchant wholesalers
Office supplies, stationery, and gift stores
Video tape and disc rental
Electrical and electronic goods merchant wholesalers
Fabric mills
Lawn and garden equipment and supplies stores
Cable and other subscription programming
Iron and steel mills and ferroalloy manufacturing
Motor vehicles manufacturing
0
5
10
15
20
Labor productivity
(Average annual percent change)
Source: U.S. Bureau of Labor Statistics.

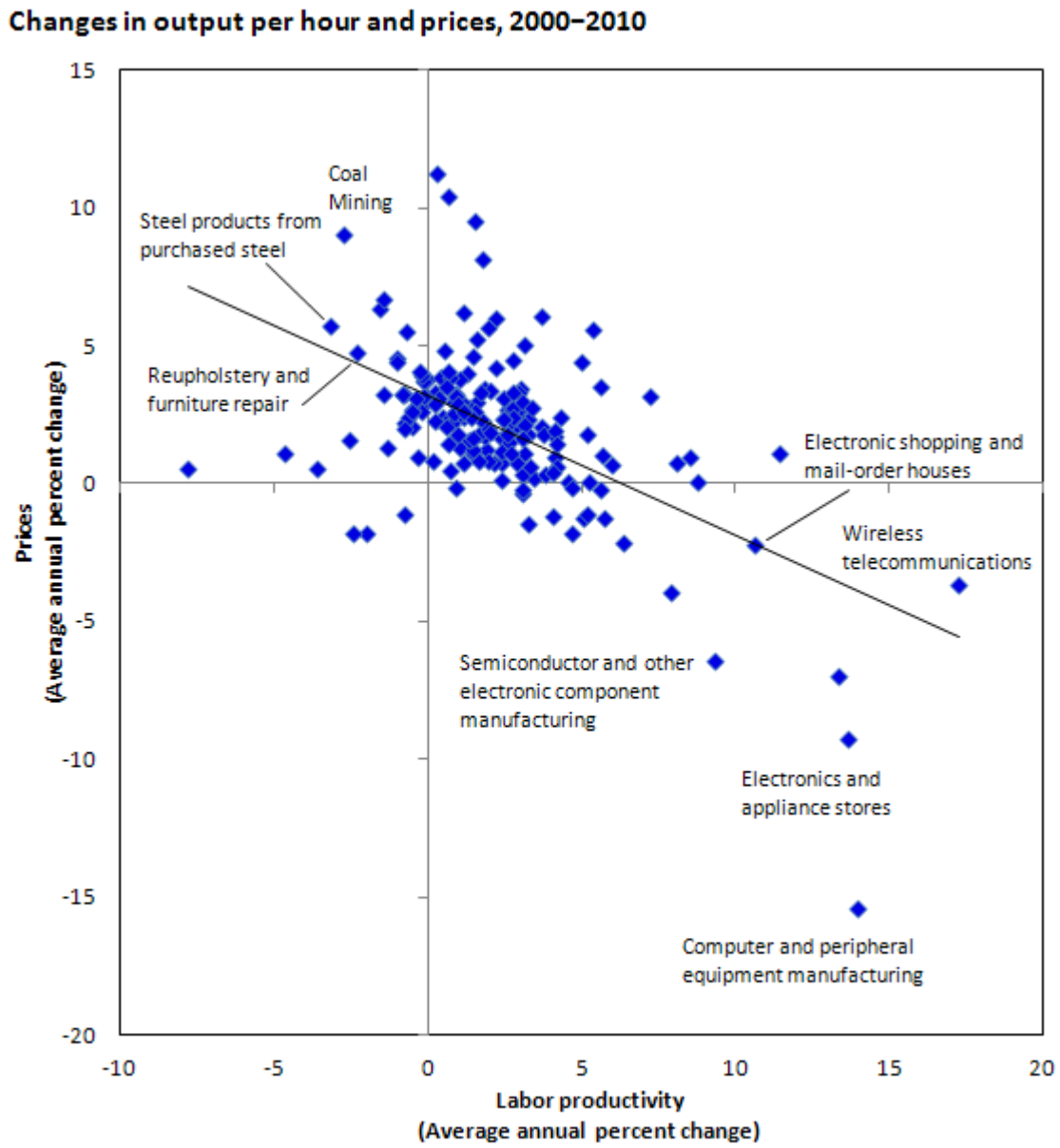
Prices tend to rise more slowly when labor productivity increases more rapidly

Increases in productivity offset the effect of hourly compensation increases on unit labor costs, a key component of price change. By reducing unit labor cost increases, productivity growth reduces inflationary pressure on prices.

In most industries studied, both productivity and prices rose from 2000 to 2010. However, industries where output prices fell were typically associated with productivity increases. In industries where productivity fell, prices were more likely to rise.

IT-related industries such as wireless telecommunications carriers, computer and peripheral equipment manufacturing, electronics and appliance stores, electronic shopping and mail-order houses, and semiconductor and other electronic component manufacturing recorded strong productivity gains in conjunction with substantial price declines between 2000 and 2010.

In contrast, coal mining, steel products from purchased steel, and reupholstery and furniture repair exhibited productivity declines combined with increasing prices during the period.



The line represents the best-fit relationship between changes in productivity and changes in prices among all industries studied.

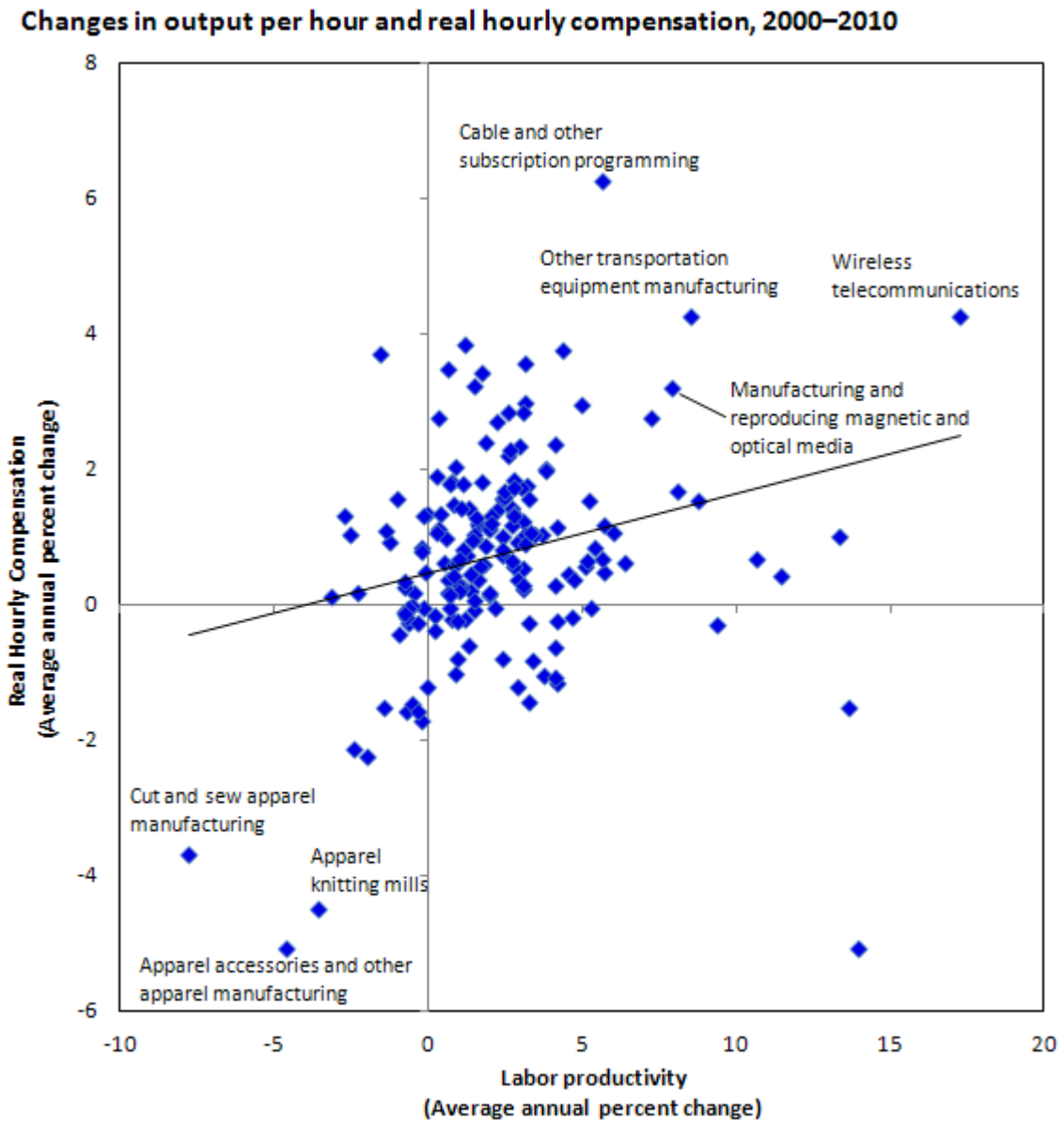
Source: U.S. Bureau of Labor Statistics.

Real hourly compensation tends to rise when labor productivity increases

Increases in labor productivity mitigate the impact of rising hourly compensation on unit labor costs facing employers. Increases in labor productivity may also lead to increases in worker compensation. Most of the industries examined here posted increases in labor productivity and real hourly compensation over the decade.

Wireless telecommunications carriers, other transportation equipment manufacturing, manufacturing and reproducing magnetic and optical media, and cable and other subscription programming are three industries with particularly large increases in productivity and real hourly compensation.

At the other extreme, three apparel manufacturing industries—cut and sew apparel manufacturing, apparel knitting mills, and apparel accessories and other apparel manufacturing—recorded significant declines in both productivity and real hourly compensation.



The line represents the best-fit relationship between changes in productivity and changes in real hourly compensation among all industries studied.

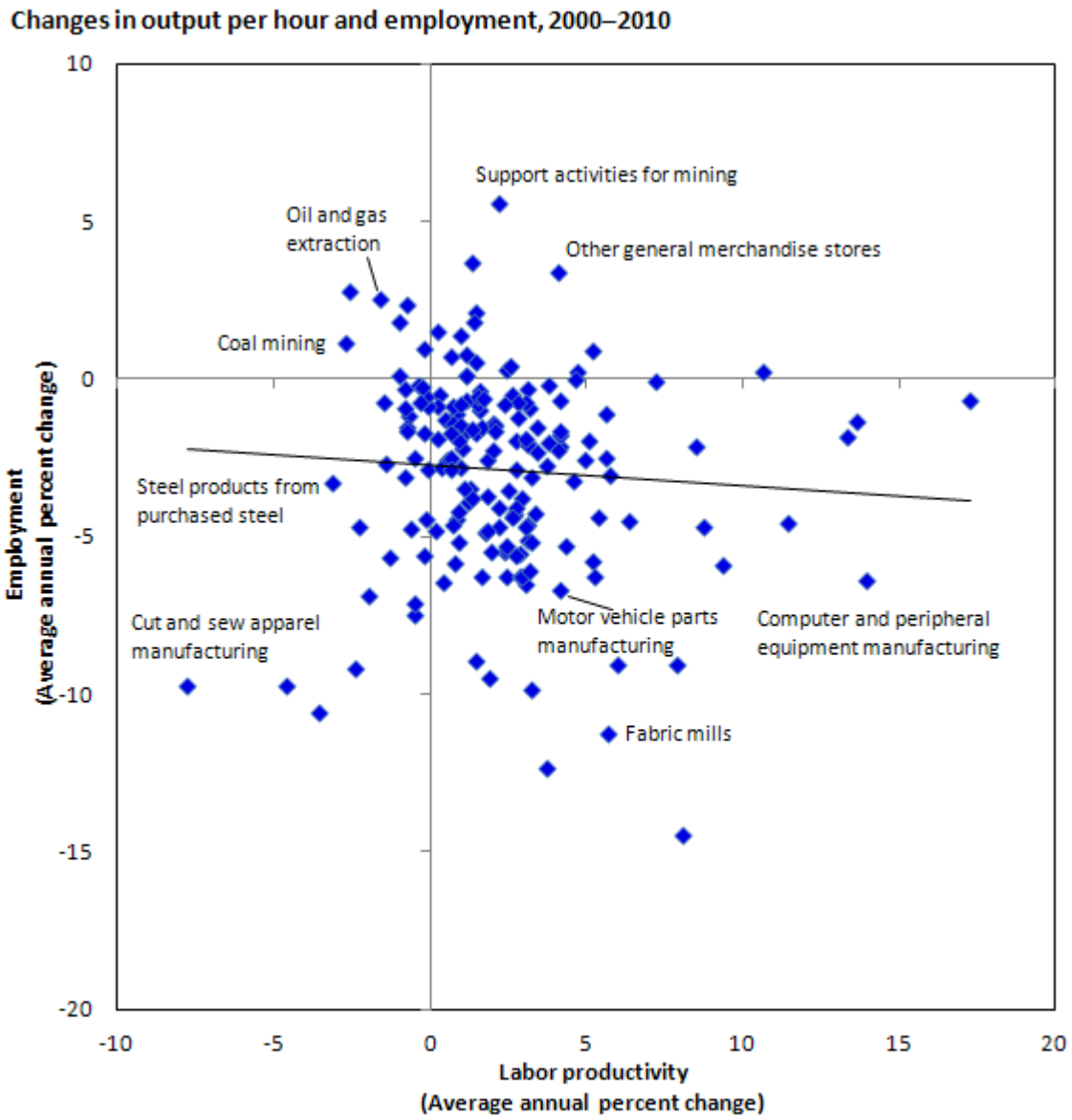
Source: U.S. Bureau of Labor Statistics.

There is no fixed relationship between employment change and labor productivity growth

Changes in productivity were not strongly correlated with changes in employment from 2000 to 2010. Productivity increased in industries where employment rose (support activities for mining and other general merchandise stores) as well as in industries where employment fell (computer and peripheral equipment manufacturing, motor vehicle parts manufacturing, and fabric mills).

Productivity decreased in industries where employment rose (oil and gas extraction and coal mining), as well as in industries where employment fell (cut and sew apparel manufacturing and steel products from purchased steel).

While there is no firm relationship between changes in employment and changes in productivity, the chart below shows that most of the industries studied recorded a combination of employment declines and productivity increases.



The line represents the best-fit relationship between changes in productivity and changes in employment among all industries studied.

Source: U.S. Bureau of Labor Statistics.

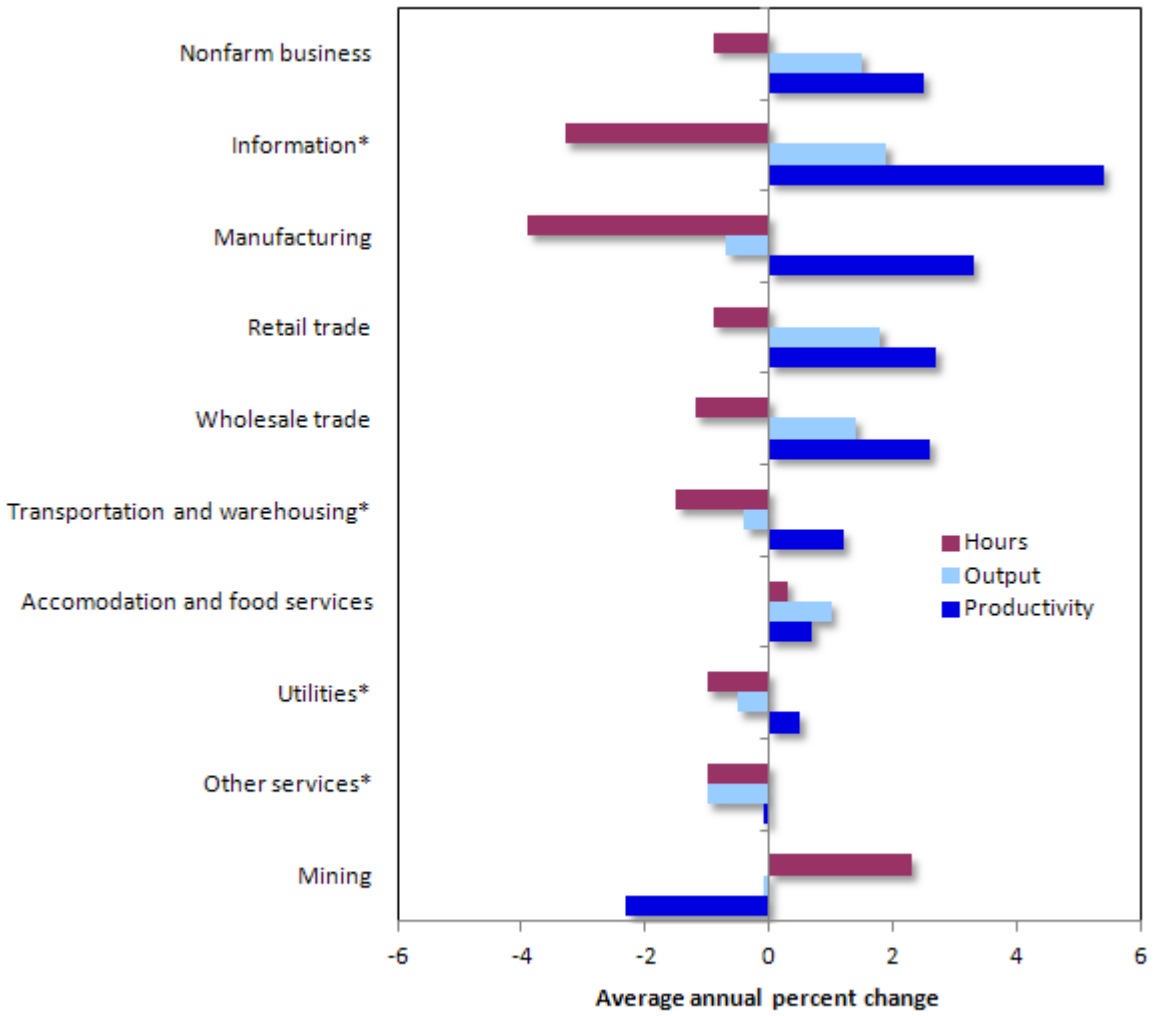
Growth in labor productivity, output, and hours by sector

Productivity increased over the decade from 2000 to 2010 in the nonfarm business sector as a whole and in most of the sectors studied. Productivity grew most rapidly in the information sector, while the manufacturing, retail trade, and wholesale trade sectors also had notable productivity increases. Productivity declined slightly in other services and more rapidly in the mining sector.

In nonfarm business overall, and in six of the nine sectors studied, productivity increases were accompanied by declines in labor hours. Hours declined most rapidly in the information, manufacturing, and transportation and warehousing sectors.

Labor hours increased in the mining sector as exploration activities increased, driven by global demand as reflected in volatile commodity prices, especially oil prices. Despite increases in labor hours, output declined slightly as more conveniently-located sources were depleted.

Changes in output per hour, output, and hours by sector, 2000–2010

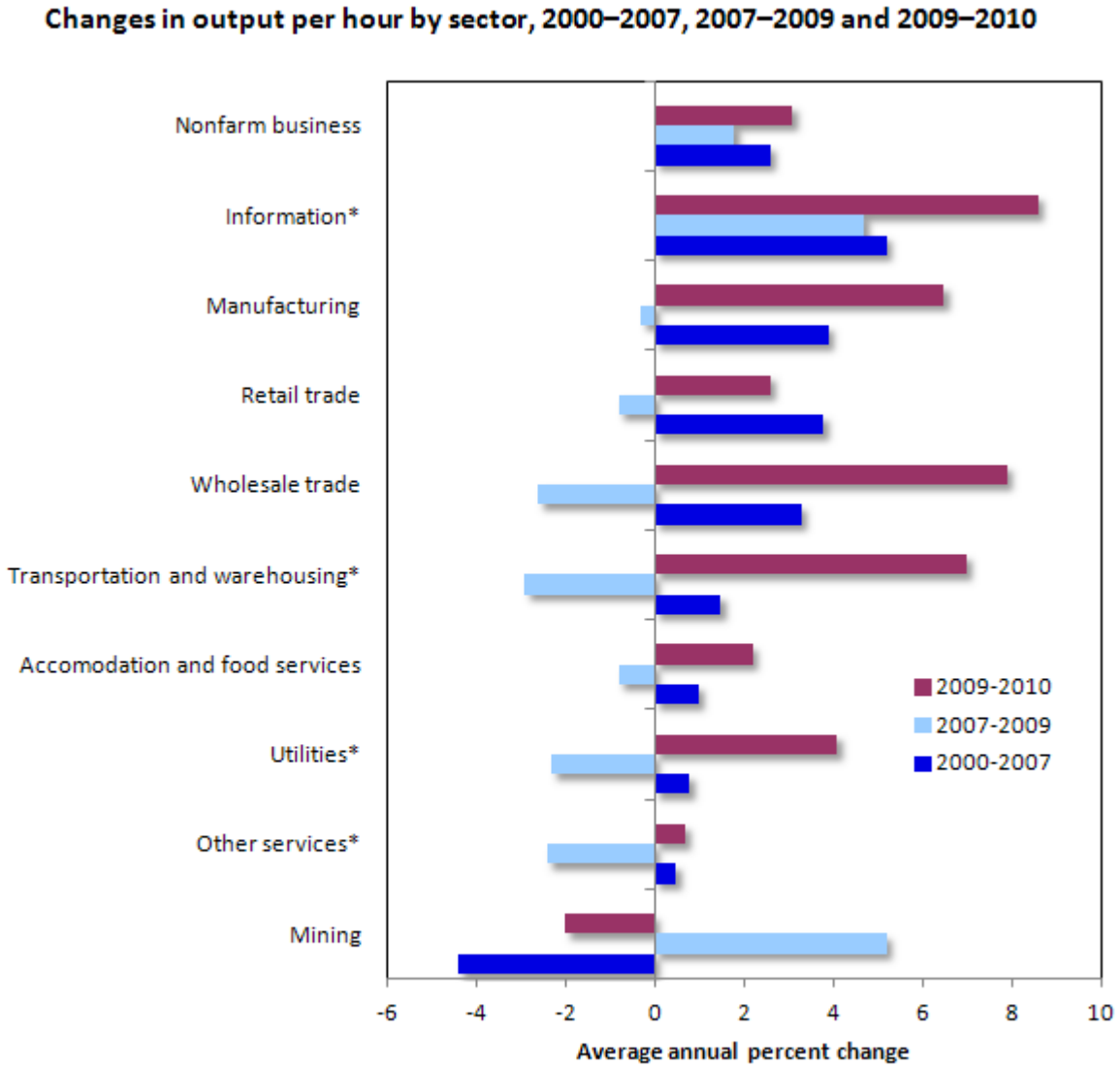


*Note: Industry coverage is significant but less than 100 percent.

Source: U.S. Bureau of Labor Statistics.

Labor productivity growth by sector and time period

From 2000 to 2007—or peak-to-peak over the full business cycle—productivity increased in the nonfarm business sector and in all but one of the component sectors studied, led by the information sector. During the recessionary period that followed, from 2007 to 2009, most sectors recorded slower productivity growth or productivity declines. In the nonfarm business sector and in eight of the nine individual sectors studied, weaker productivity performance during the recession was followed by a strong rebound in 2010.



*Note: Industry coverage is significant but less than 100 percent.

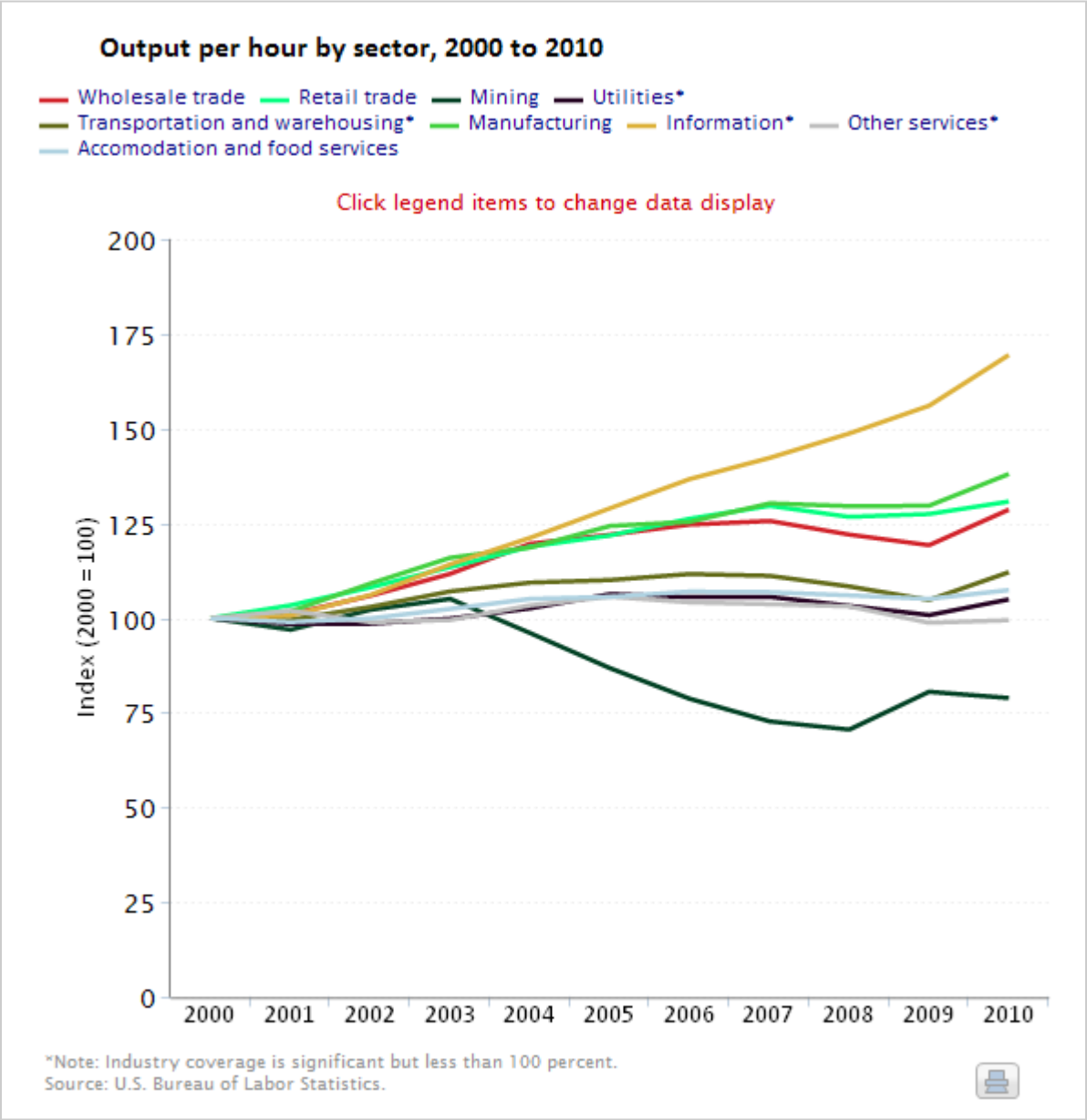
Source: U.S. Bureau of Labor Statistics.

Labor productivity growth by sector

The patterns of productivity growth over the decade differed by sector. In most of the measured sectors, productivity grew more rapidly during the early stages of the 2000–2007 business cycle, then more gradually over the later parts of the cycle. Most of the sectors recorded some decline in productivity during the 2007–2009 recession and a strong rebound in productivity growth during the first year of the recovery, 2009–2010.

Productivity in the information sector grew steadily at a rapid pace throughout the decade, slowing only slightly during the 2007–2009 recessionary period and accelerating during the first year of the recovery.

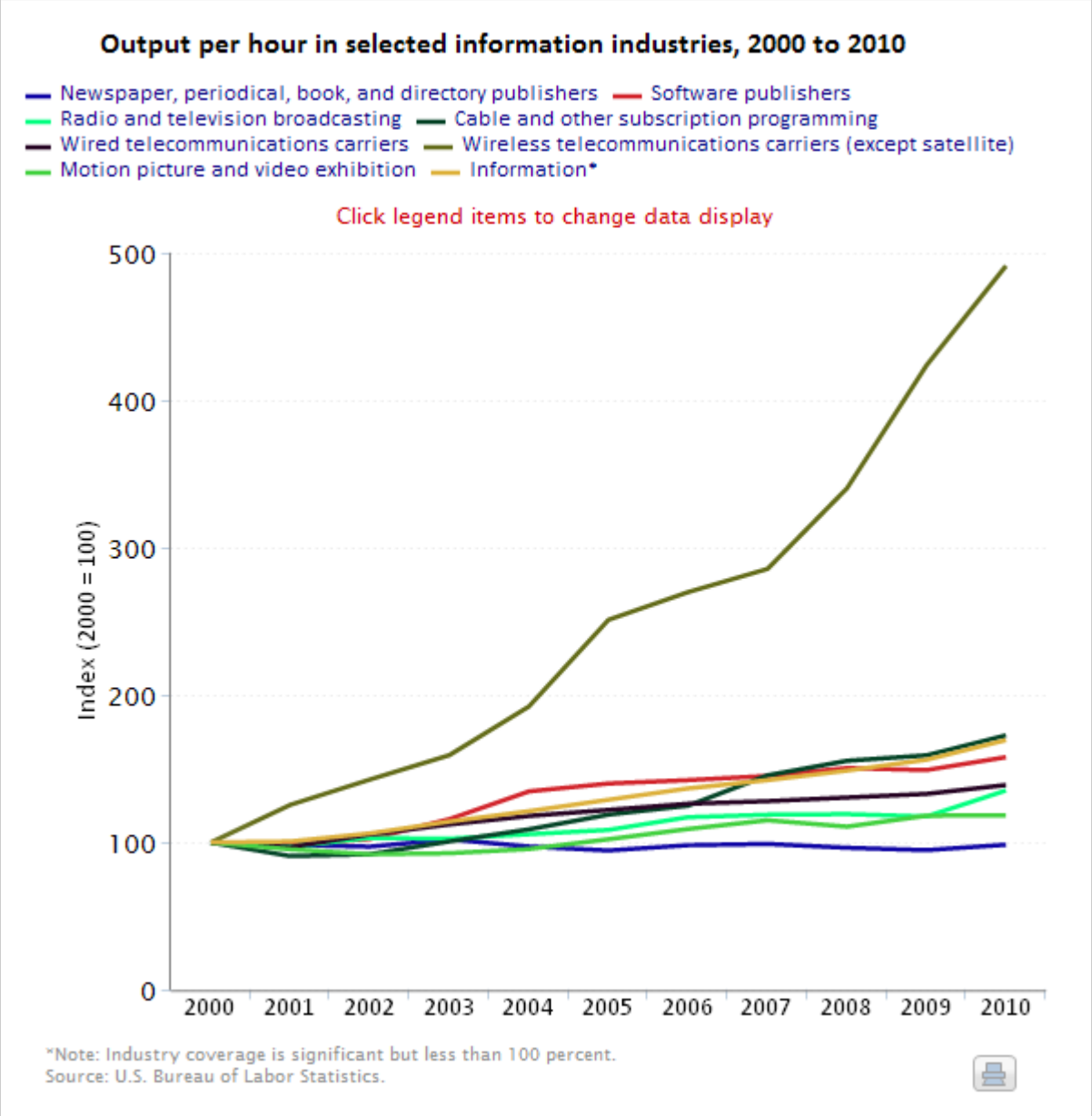
Mining productivity trends differed from those in the other sectors studied. Productivity fell during the full business cycle, reflecting increasing labor hours and decreasing returns to exploration activities. This trend was reversed during the recessionary period of 2007–2009 as falling commodity prices caused exploration activities to be reduced and labor hours to fall.


Output per hour by sector, 2000 to 2010
Wholesale trade
Retail trade
Mining
Utilities*
Transportation and warehousing*
Manufacturing
Information*
Other services*
Accomodation and food services
Click legend items to change data display
Index (2000 = 100)
200
175
150
125
100
75
50
25
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
*Note: Industry coverage is significant but less than 100 percent.
Source: U.S. Bureau of Labor Statistics.

Information sector

Rapid productivity growth occurred in the wireless telecommunications carriers industry over the decade, as sales of wireless services grew strongly with fewer hours of labor input required. Competition with wireless telecommunications resulted in declining sales of wired telecommunications services as households switched from land lines to wireless carriers for their telecommunications needs. However, productivity also improved in the wired telecommunications carriers industry, as labor hours fell even more than output.

Productivity rose moderately in most of the other information industries but fell slightly in newspaper, periodical, book and directory publishers. Competition from electronic publications resulted in declining subscriptions for traditional print media.



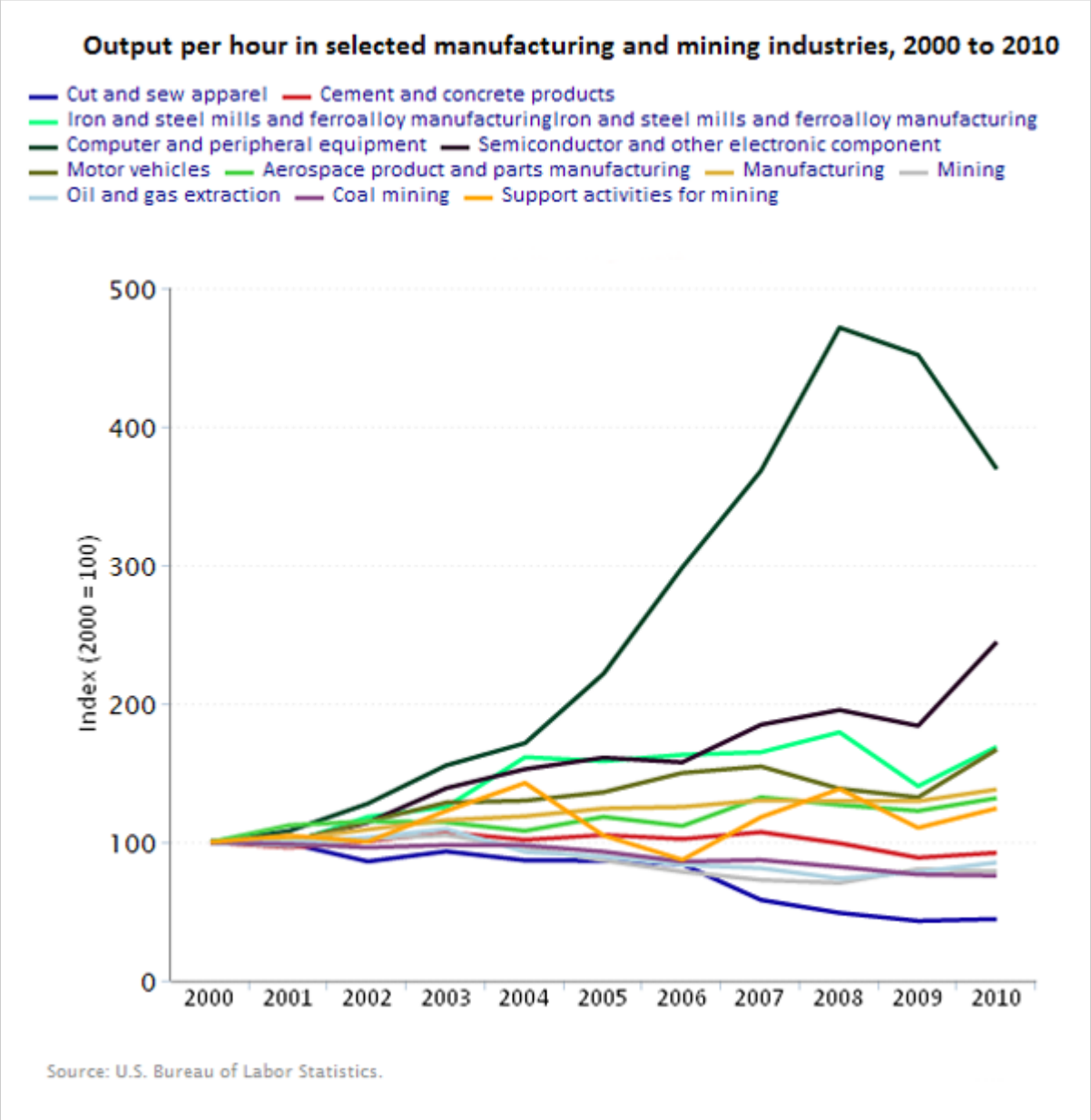
Manufacturing and mining sectors

Productivity rose in the manufacturing sector and in most component industries from 2000 to 2010. For the sector as a whole and for many manufacturing industries, productivity growth was accompanied by declining labor hours. Productivity fell in the mining sector and in the oil and gas extraction and coal mining industries as output grew weakly or declined and hours rose.

Computer and peripheral equipment manufacturing recorded very rapid productivity growth through 2008, but productivity fell during the recession. Productivity and output in semiconductor and electronic component manufacturing expanded more gradually, but growth accelerated as the economy recovered after 2009.

A number of manufacturing industries were adversely impacted by the recession from 2007 to 2009. While some, like motor vehicle manufacturers, adopted structural changes that resulted in a strong rebound in productivity during the recovery, others did not recover as quickly. Cut and sew apparel manufacturing experienced significant declines in output, hours, and productivity throughout the decade.

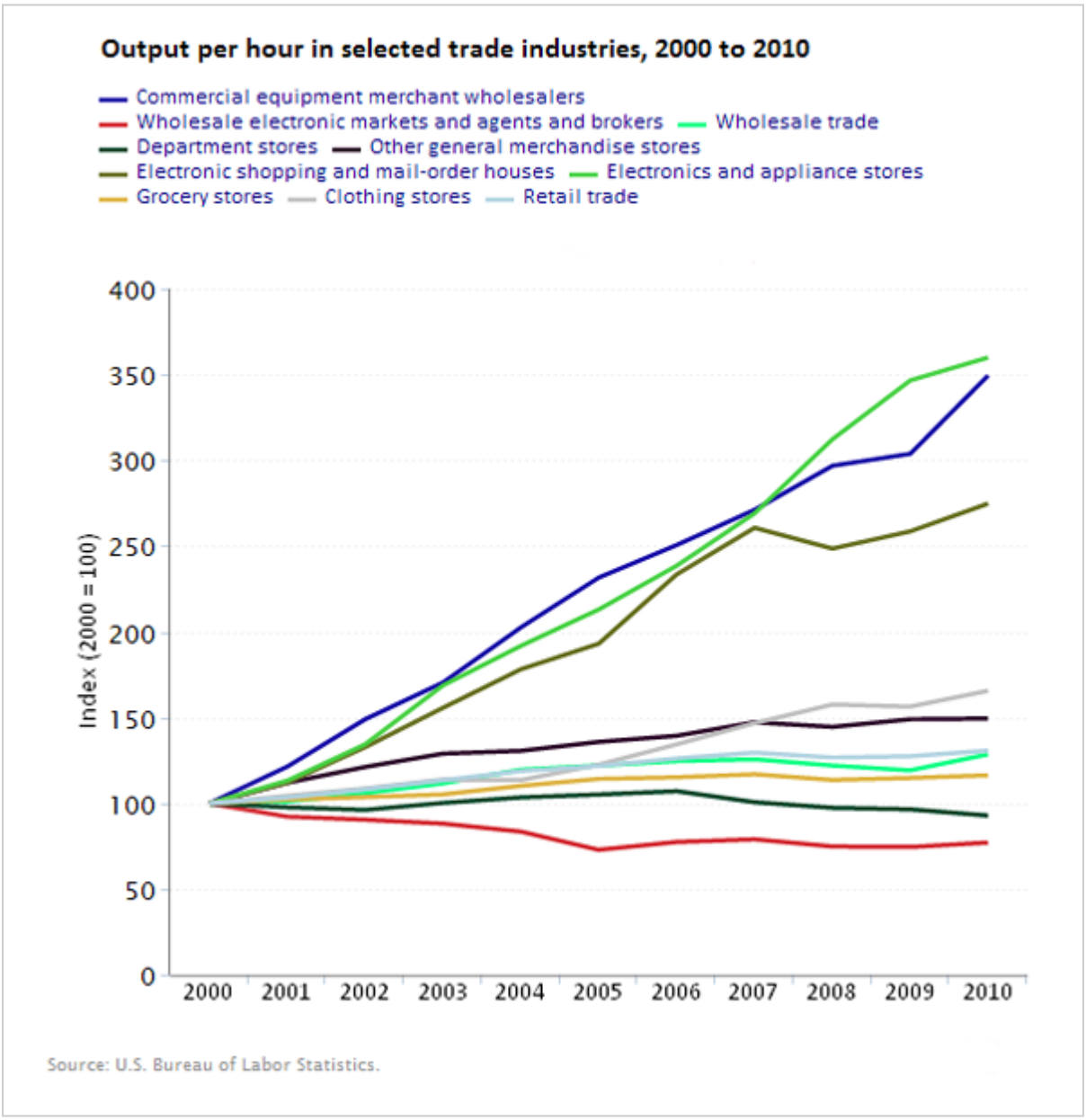
Mining sector productivity closely paralleled the trend seen in the oil and gas extraction industry, where hours rose faster than output. The output and hours of the support activities for mining industry grew rapidly, but those services were entirely consumed by the mining extraction industries and therefore did not contribute to the output sold outside the mining sector.


Output per hour in selected manufacturing and mining industries, 2000 to 2010
Cut and sew apparel
Cement and concrete products
Iron and steel mills and ferroalloy manufacturingIron and steel mills and ferroalloy manufacturing
Computer and peripheral equipment
Semiconductor and other electronic component
Motor vehicles
Aerospace product and parts manufacturing
Manufacturing
Mining
Oil and gas extraction
Coal mining
Support activities for mining
Index (2000 = 100)
500
400
300
200
100
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Source: U.S. Bureau of Labor Statistics.

Retail and wholesale trade sectors

Productivity growth in retail trade was concentrated in electronics and appliance stores and electronic shopping and mail-order houses. In other general merchandise stores, which include warehouse clubs and supercenters, productivity grew slightly faster than the average for the sector. Output growth in these industries was accompanied by declines or slower growth in employee hours. Productivity in department stores was nearly flat, declining slightly over the period as output dropped more than labor hours.

Productivity growth in the wholesale trade sector reflects, in part, particularly large productivity gains in commercial equipment merchant wholesalers, which includes the wholesaling of computers, medical and surgical equipment, and other IT equipment. The declining productivity in wholesale electronic markets and agents and brokers was mainly due to flat output and rising hours for agents and brokers, who buy and sell goods on others' behalf. Wholesale electronic (business-to-business) markets recorded productivity gains, but this represents a much smaller component of the industry.


Output per hour in selected trade industries, 2000 to 2010
Commercial equipment merchant wholesalers
Wholesale electronic markets and agents and brokers
Wholesale trade
Department stores
Other general merchandise stores
Electronic shopping and mail-order houses
Electronics and appliance stores
Grocery stores
Clothing stores
Retail trade
Index (2000 = 100)
400
350
300
250
200
150
100
50
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Source: U.S. Bureau of Labor Statistics.

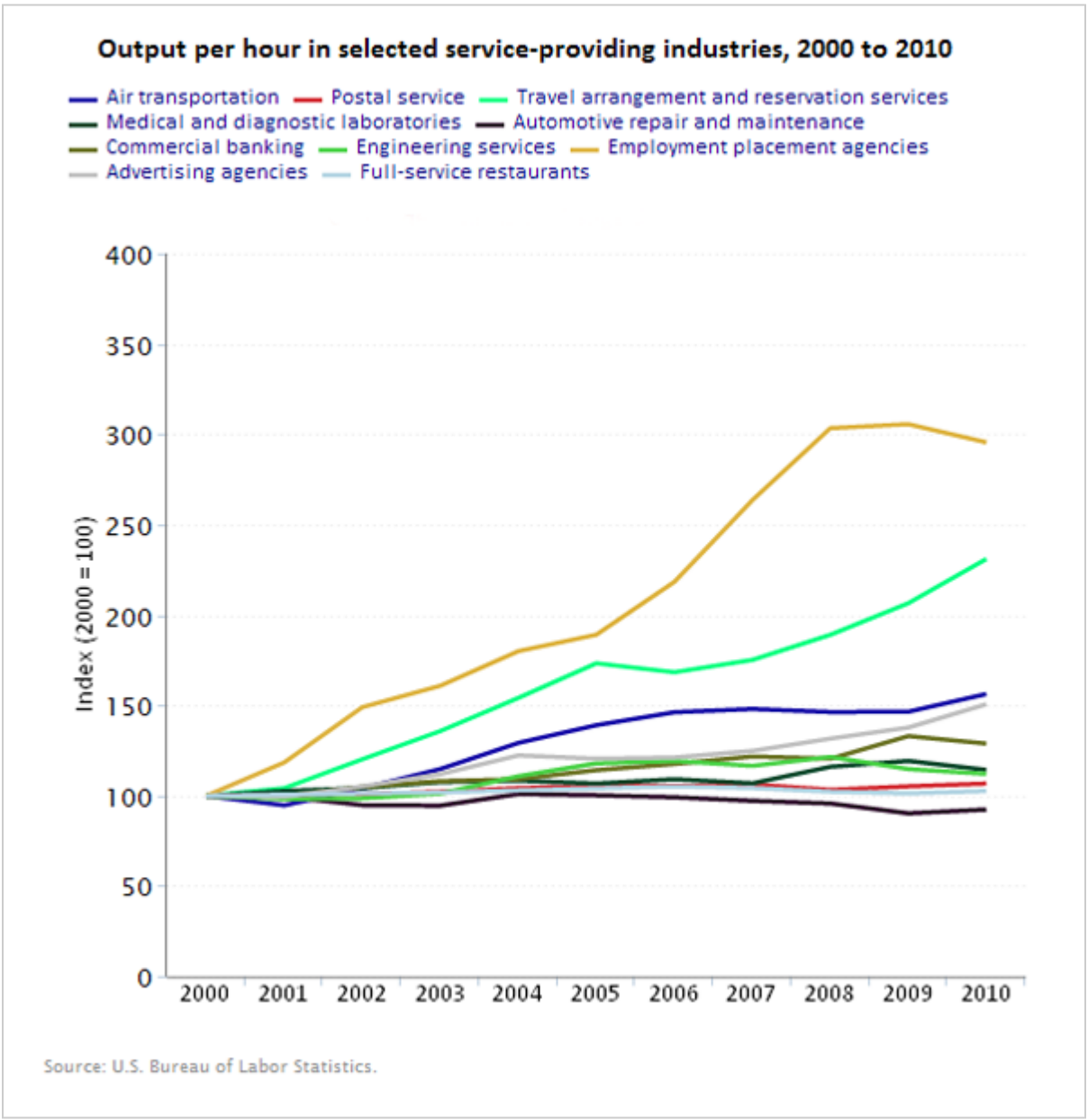
Selected service-providing industries

Productivity growth resulted from structural changes in a number of service-providing industries, caused by advances in IT that reduced employee hours or limited their growth. In some industries, such as employment placement agencies and travel arrangement and reservation services, output increased despite reductions in employee hours.

In commercial banking, a number of changes, including deregulation of the industry and the increased use of IT, affected productivity growth. Deregulation allowed banks to offer new services and led to increased competition and consolidation in the industry. Expanded use of ATM machines, the internet, and other types of IT-in service delivery helped to reduce costs and also enabled banks to offer new services without a proportional increase in staff.

Productivity in air transportation was affected by structural changes and events that occurred over the decade. Mergers, the rise of low-cost carriers, and the adverse effects of the September 11th, 2001 terrorist attacks impacted the growth in output, hours, and productivity in the industry. Despite setbacks to the industry, air carriers were able to substantially increase output while reducing labor input.

For the postal service, competition from online services and couriers caused a decrease in output, but the organization engaged in aggressive cost cutting measures to reduce labor hours. This resulted in a rise in productivity during the time period.


Output per hour in selected service-providing industries, 2000 to 2010
Air transportation
Postal service
Travel arrangement and reservation services
Medical and diagnostic laboratories
Automotive repair and maintenance
Commercial banking
Engineering services
Employment placement agencies
Advertising agencies
Full-service restaurants
Index (2000 = 100)
400
350
300
250
200
150
100
50
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Source: U.S. Bureau of Labor Statistics.

More

Overview of BLS productivity statistics.

Recent article: "Improved measures of commercial banking output and productivity," by Sara E. Royster, in the July 2012 issue of the *Monthly Labor Review*.

Link to data retrieval tools to access the following productivity data:

- Major sector productivity and costs
- Major sector multifactor productivity
- Industry productivity and costs
- International labor comparisons

Note: Data in text, charts, and tables are the latest available at the time of publication. Internet links may lead to more recent data.

General Information: (202) 691-5200
Media Contact: (202) 691-5902