

The compensation-productivity gap: a visual essay

Susan Fleck, John Glaser, and Shawn Sprague

Productivity and compensation measures yield information on the extent to which the employed benefit from economic growth. Productivity growth provides the basis for rising living standards; real hourly compensation is a measure of workers' purchasing power. Increases in labor productivity—the most commonly used productivity measure—reflect investments in capital equipment and information technology, and the hiring of more highly skilled workers. Employers' ability to raise wages and other compensation is tied to increases in labor productivity. Since the 1970s, growth in inflation-adjusted, or real, hourly compensation has lagged behind labor productivity growth. This gap between the two measures is the subject of this visual essay.

The gap between real hourly compensation and labor productivity is one of a number of “wage gaps” that indicate whether workers' compensation or wages keep up with productivity. There are a number of sources for compensation measures, as well as different ways to apply price indexes to adjust for inflation.¹ This visual essay presents real hourly compensation data based on compensation data from the National Income and Product Accounts, which is the same source that the BLS productivity program uses for output. Compensation data are adjusted by using a consumer price index, and output is adjusted by using an implicit price deflator. The gap between real hourly compensation and labor productivity will be referred to in this essay as the compensation-productivity gap.

This visual essay presents relationships that are definitional rather than causal. There are two main

components that account for the magnitude and direction of the compensation-productivity gap. The first is the difference between the price indexes used to adjust for inflation in the BLS hourly compensation and productivity measures. The Consumer Price Index and the implicit price deflator comprise different baskets of goods and services; if consumer prices rise more quickly than output prices, purchasing power falls and the compensation-productivity gap grows.

The second component, “labor share,” is the share of output accounted for by employees' compensation. Labor share is a measure of how much of the economic pie goes to all workers. When labor share is constant or rising, workers benefit from economic growth. When labor share falls, the compensation-productivity gap widens. Concurrently, nonlabor costs—which include intermediate inputs into production and returns to investments, or profits—represent a greater share of output. Because real hourly compensation and labor productivity, which is output per hour, both include hours worked in their calculations, changes in hours worked have no impact on the gap.

The series of charts in this visual essay presents an overview of the growing compensation-productivity gap, using this measure and others to examine the U.S. nonfarm business and manufacturing sectors. The nonfarm business sector accounts for three-fourths of output and employment in the total economy; manufacturing—a portion of nonfarm businesses—produced about 11 percent of U.S. output and accounted for just over 8 percent of total U.S. employment in 2009. The data presented are published by the major sector productivity program at BLS.

More than 60 years of quarterly and annual data, spanning 11 cycles of recessions and expansions, showcase trends in productivity and real hourly compensation. Some of the line charts highlight the cyclical nature of productivity, which generally declines in recessions and rises during expansions. Productivity and compensation trends also reflect long-term changes in production. The bar charts show long-term trends by use of annual data grouped into periods that contain multiple business cycles.

Quarterly data are presented through the third quarter of 2010. Annual data for the nonfarm business sector are available through 2009. Preliminary manufacturing productivity and real hourly compensation measures are available through the most recent quarter of 2010 on a quarterly basis and through 2009 on an annual basis, but the data used to calculate price adjustments and labor share are available only through 2008. Furthermore, multifactor productivity measures are published for 1987 through 2008 only. This explains why charts 8 through 11, which include data for the manufacturing sector, end at 2008.

A peak in economic activity marks the end of an economic expansion, and a trough marks the end of a recession. These turning points are officially designated by the National Bureau of Economic Research (see www.nber.org/cycles/cyclesmain.html). In all of the line charts except for chart 11, recessionary periods have been shaded. They are shaded to include the month after the peak month through the trough month. The trough of the most recent recession was June 2009.

Most of the charts focus on labor productivity as it relates to compensation; others show the relative changes in price indexes or labor share of output. Chart 11 uses multifactor productivity measures to show the changing trends in labor costs and other costs. These measures and all others included in this visual essay, except for the implicit price deflator (IPD) for nonfarm business output, are prepared by the Division of Major Sector Productivity in the Office of Productivity and Technology at the Bureau of Labor Statistics. Productivity measures incorporate data published primarily by other Bureau of Labor Statistics programs, the Bureau of Economic Analysis (BEA), and the Federal Reserve Board.

The real hourly compensation measures used in this essay differ from other compensation measures published by BLS. The productivity program develops the measures on the basis of BLS and BEA data, making adjustments for coverage. The IPD for nonfarm business output is published by the BEA. The consumer price index prepared by the BLS productivity program is the quarterly average of the monthly BLS Consumer Price Index for all Urban Consumers Research Series (CPI-U-RS) for 1978 through the most recent full year, currently 2009. Changes in the BLS CPI for all Urban Consumers (CPI-U) are used to estimate an index for years prior to 1978 and for recent quarters. The productivity program's consumer price index based on these measures is displayed in this essay.

Data are presented as indexes and growth rates. Index measures are derived from data on output, hours worked, prices, compensation, and other non-labor inputs. Comparing data which are based on different units and levels—such as billions of dollars and thousands of hours—can skew analysis. To improve comparative analysis among widely different measures over long periods of time in the line charts, the indexes were rebased to 100 in the beginning period for easier visual comparison, and then natural logarithms were calculated to ensure constant proportionality of the growth of each index across time. Without this logarithmic transformation, the line graphs would tend to show greater variability towards the end of the period. The growth rates are percent changes in quarterly or annual indexes and are compounded annual growth rates. The compensation-productivity gap is the percentage-point difference between the compounded annual growth rates of real hourly compensation and productivity over the same period. All quarterly data are seasonally adjusted.

The charts presented here are based on the December 1, 2010, Productivity and Costs news release prepared by BLS. The data in charts 1 through 10 are updated eight times a year in the Productivity and Costs news release. The data in chart 11 are updated once each year in the Multifactor Productivity Trends in Manufacturing news release, most recently published on November 18, 2010. Data are quar-

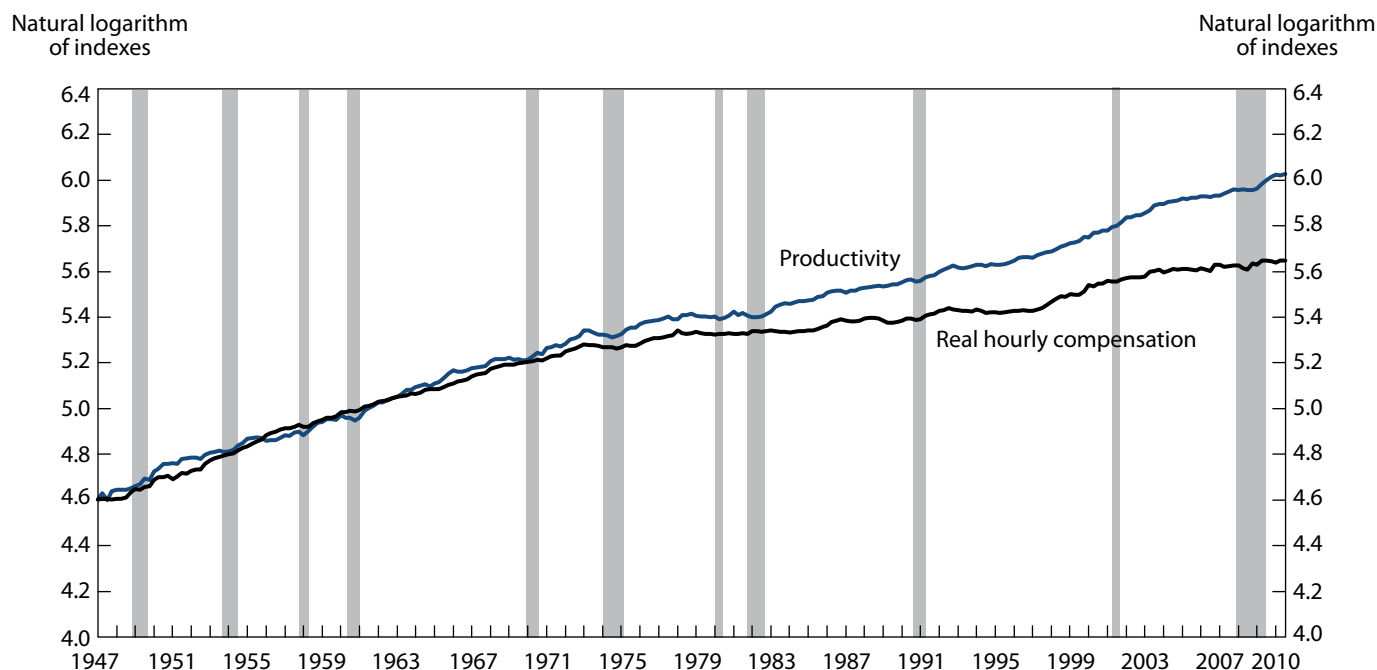
terly or annual, depending on the data series. Data are available by accessing the BLS Web site at www.bls.gov/data/home.htm or by contacting the BLS Division of Major Sector Productivity by telephone at (202) 691-5606 or by e-mail at DPRWEB@bls.gov. This essay was prepared by Susan Fleck, division chief; John Glaser, supervisory economist; and Shawn Sprague, economist; all of whom work in the Division of Major Sector Productivity in the Office

of Productivity and Technology at the Bureau of Labor Statistics.

Note

¹ For a comparison of BLS compensation measures, see Joseph R. Meisenheimer II, "Real compensation, 1979 to 2003: analysis from several data sources," *Monthly Labor Review*, May 2005, pp. 3–22, on the Internet at www.bls.gov/opub/mlr/2005/05/art1full.pdf (visited Jan. 18, 2011).

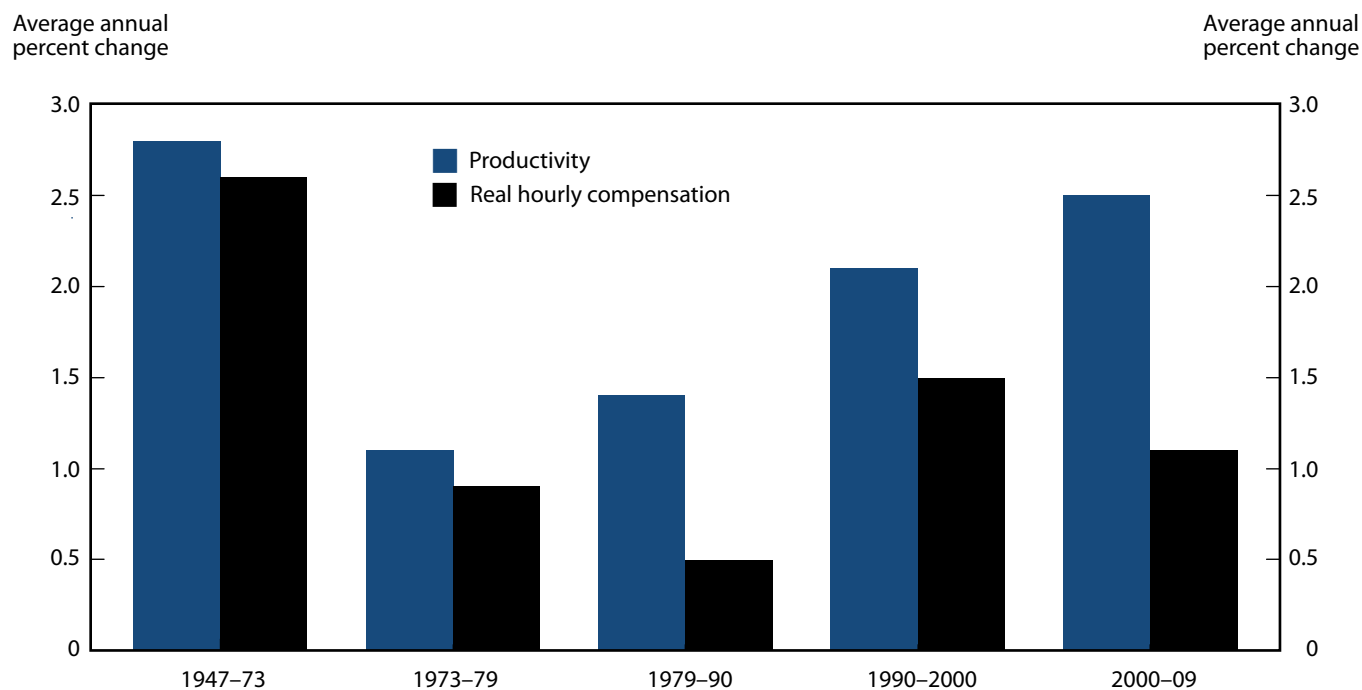
1. Productivity and real hourly compensation, nonfarm business sector, first quarter 1947–third quarter 2010



NOTE: The shaded bars denote National Bureau of Economic Research (NBER)-designated recessions.

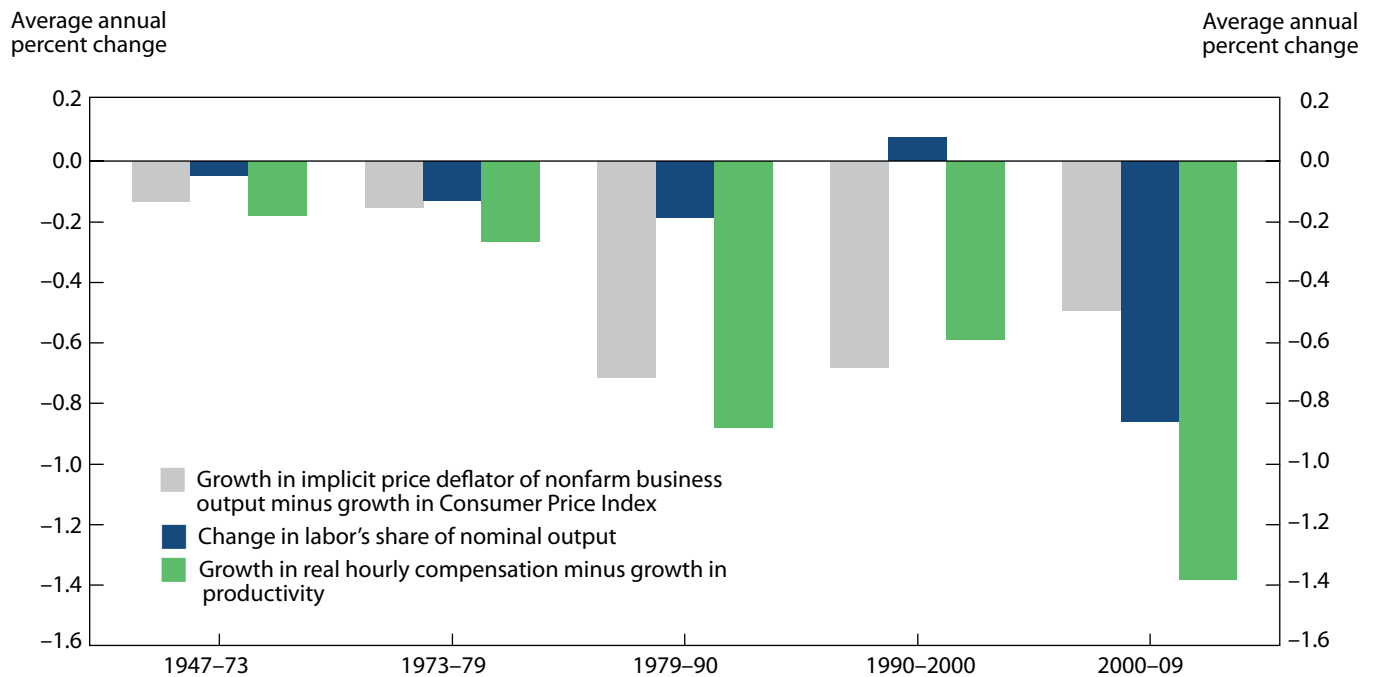
- Labor productivity is output, adjusted for price changes, divided by hours worked at all jobs. Productivity in the U.S. nonfarm business sector grew an average of 2.2 percent per year over the past 63 years, despite a prolonged slowdown from 1973 to 1995.
- Real hourly compensation is the hourly cost to businesses, adjusted for price changes, of wages, salaries, and benefits paid to workers. Real hourly compensation grew at an average annual rate of 1.7 percent over the 63-year period. Since the 1970s, real hourly compensation has grown more slowly than productivity.

2. Productivity growth and real hourly compensation growth, nonfarm business sector, selected periods, 1947–2009



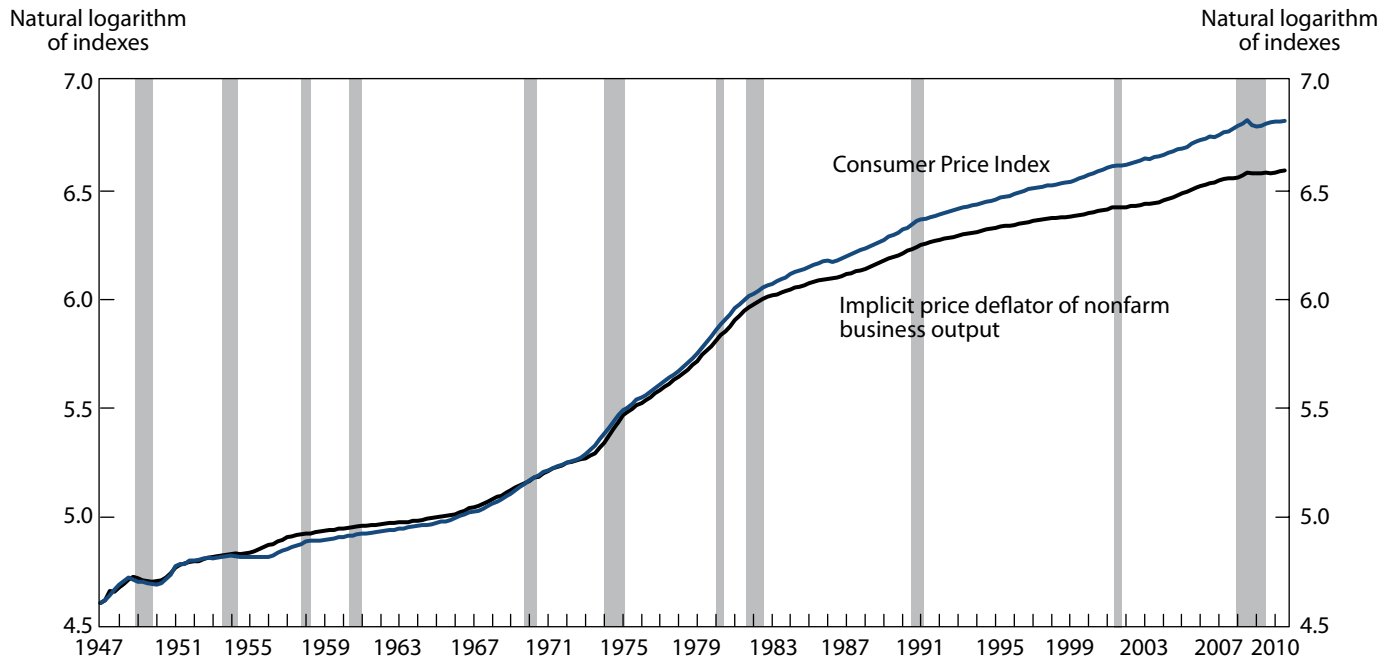
- Growth of productivity and real hourly compensation was robust until 1973, at which time growth slowed for both.
- Real hourly compensation growth failed to keep pace with accelerating productivity growth over the past three decades, and the gap between productivity growth and compensation growth widened.

3. Changes in price differences, labor share, and the compensation-productivity gap, nonfarm business sector, selected periods, 1947–2009



- There are two components that account for the gap between real hourly compensation growth and productivity growth. The first is the difference between the price indexes used to account for inflation in the BLS productivity and hourly compensation measures. The second is the change in “labor share,” which, as explained earlier, is the share of output that is accounted for by workers’ wages, salaries, and benefits.
- Before 2000, the difference between the growth rates of the CPI and the IPD—that is, the difference in inflation rates—explained most of the gap in each period. For 2000 to 2009, an unprecedented decline in labor share accounted for most of the gap.

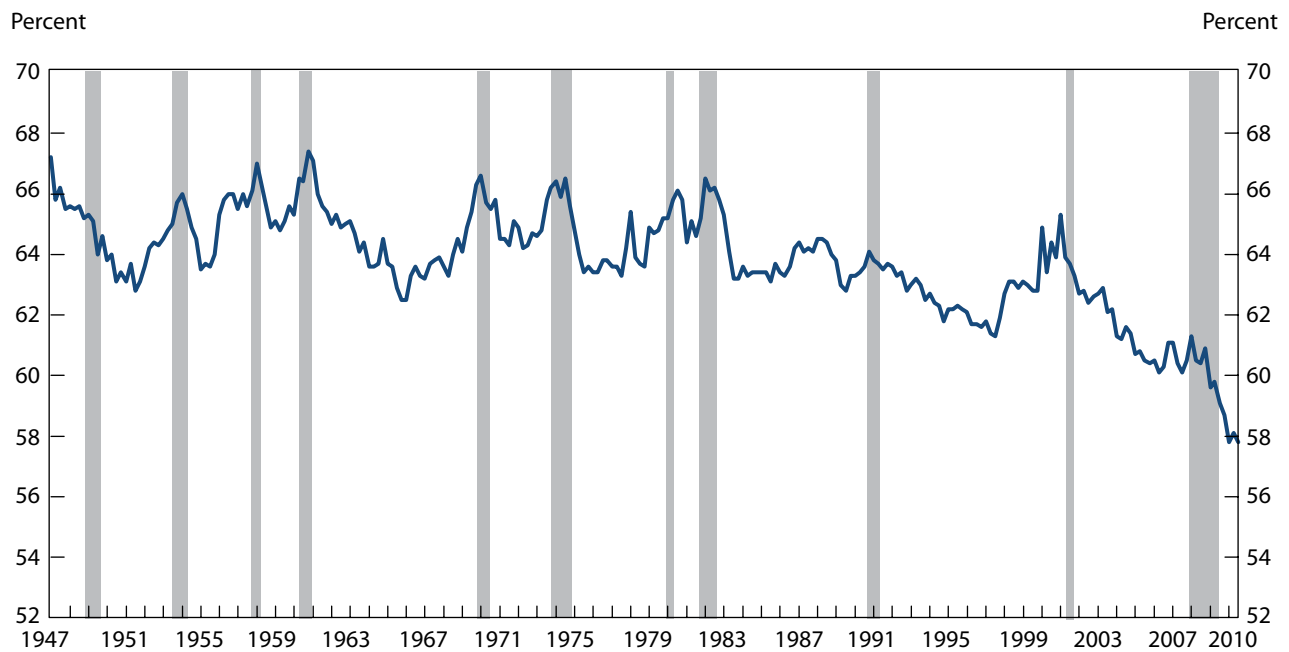
4. Price indexes, nonfarm business sector, first quarter 1947–third quarter 2010



NOTE: The shaded bars denote National Bureau of Economic Research (NBER)-designated recessions.

- A price index measures the price of a basket of goods and services over time. The compensation–productivity gap is partly accounted for by the difference between the two price indexes used to remove the effect of inflation. The implicit price deflator, used to remove the effect of inflation on output, measures price changes in the goods and services produced in the nonfarm business sector. The Consumer Price Index measures price changes in the basket of goods and services purchased by families and workers; it is used to calculate real hourly compensation.
- The Consumer Price Index has grown more quickly than the implicit price deflator in recent decades. The difference can be explained partly by computers. Since the 1990s, computers have represented a larger share of nonfarm business output than of consumer purchases. As the cost of computers fell, the effect of ever-cheaper computers slowed the growth of output prices more than it slowed the growth of the CPI.

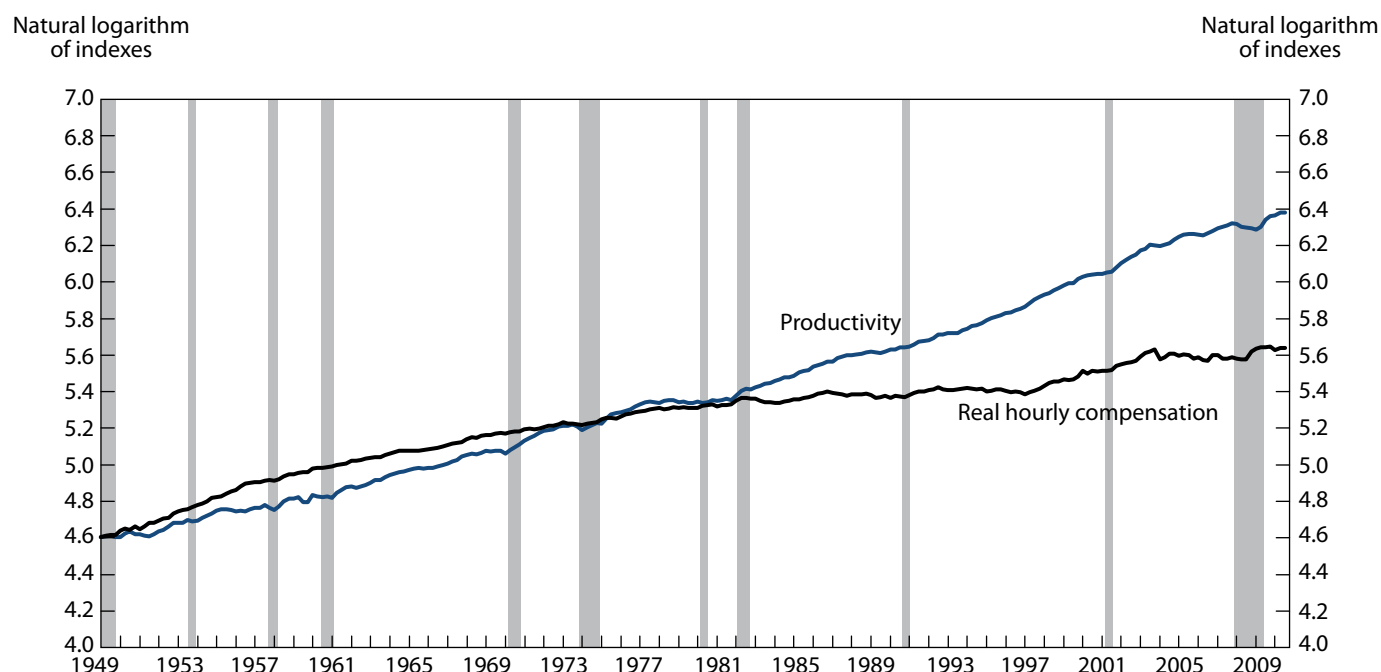
5. Labor share of nonfarm business sector output, first quarter 1947–third quarter 2010



NOTE: The shaded bars denote National Bureau of Economic Research (NBER)-designated recessions.

- Labor share is the portion of output that employers spend on labor costs (wages, salaries, and benefits) valued in each year's prices. Nonlabor share—the remaining portion of output—includes returns to capital, such as profits, net interest, depreciation, and indirect taxes.
- Labor share averaged 64.3 percent from 1947 to 2000. Labor share has declined over the past decade, falling to its lowest point in the third quarter of 2010, 57.8 percent. The change in labor share from one period to the next has become a major factor contributing to the compensation–productivity gap in the nonfarm business sector.

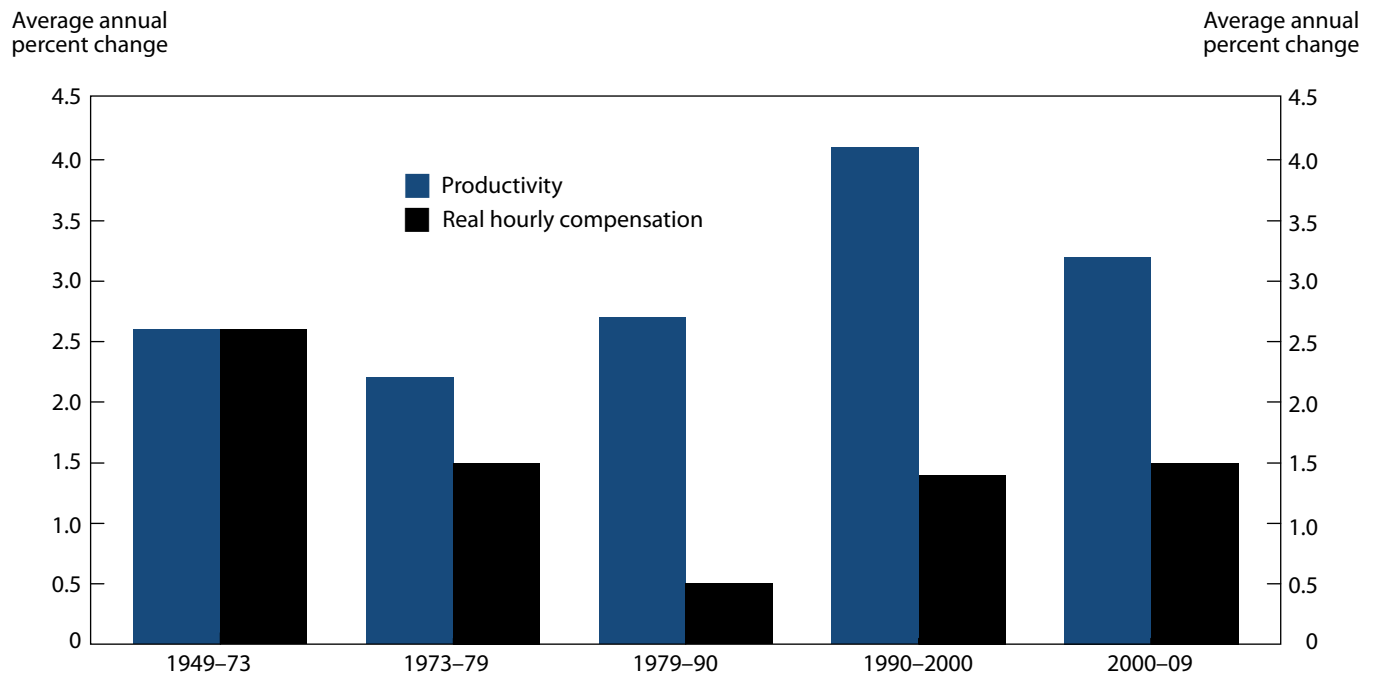
6. Productivity and real hourly compensation, manufacturing sector, first quarter 1949–third quarter 2010



NOTE: The shaded bars denote National Bureau of Economic Research (NBER)-designated recessions.

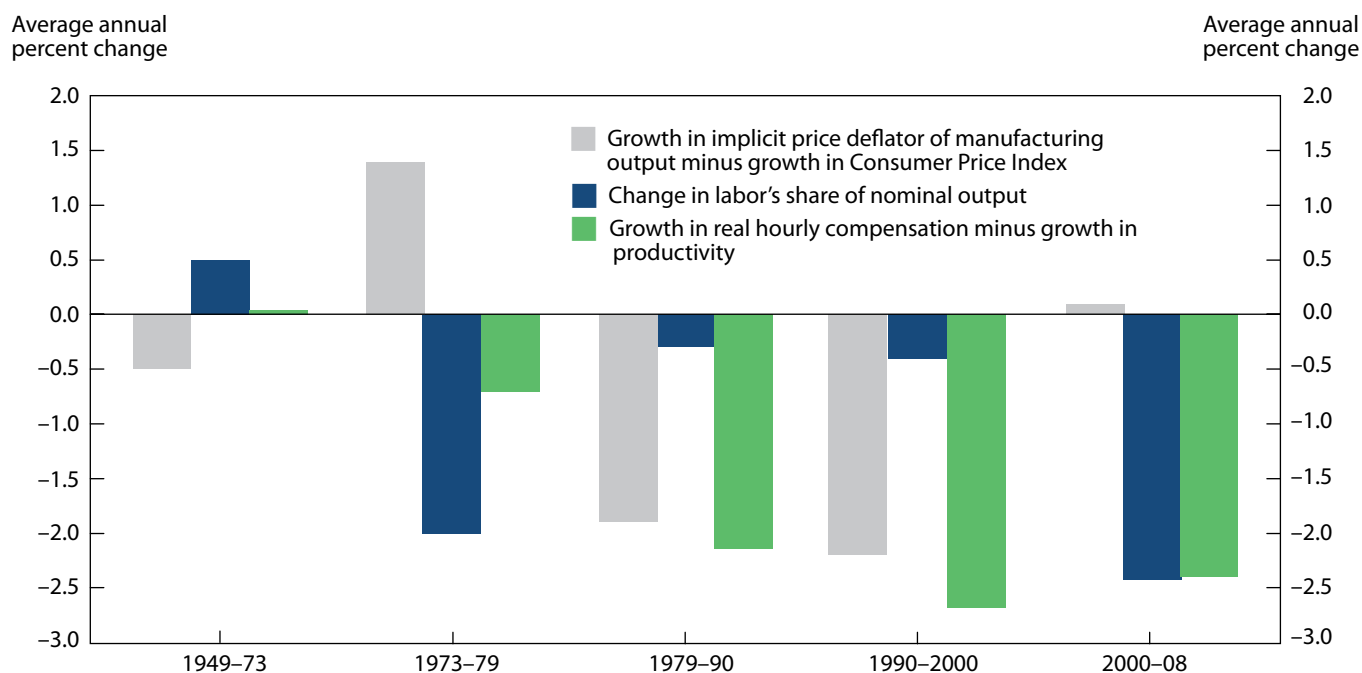
- Productivity in the manufacturing sector has risen 2.9 percent on average each year since 1949, despite a slowdown from 1973 through 1981.
- Growth in real hourly compensation kept ahead of productivity growth in the manufacturing sector until the mid-1970s. Subsequently, productivity continued its upward trend, whereas real hourly compensation growth was relatively flat.

7. Productivity growth and real hourly compensation growth, manufacturing sector, selected periods, 1949–2009



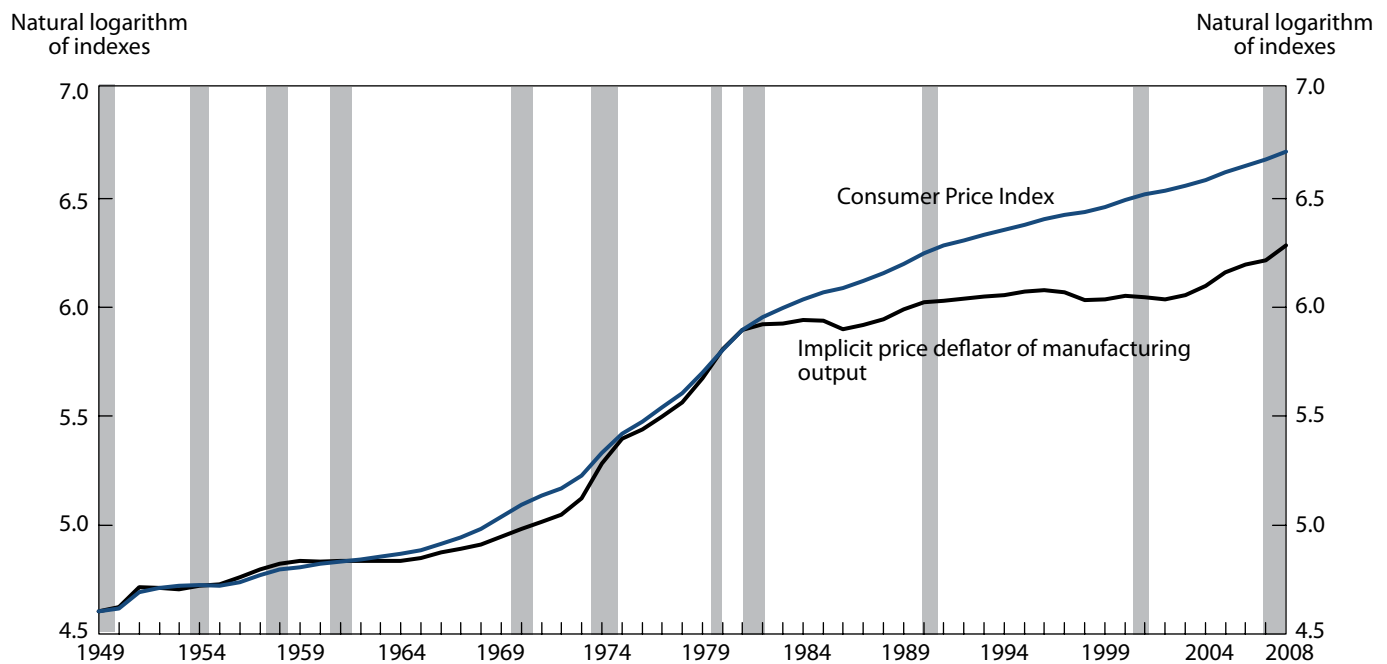
- Growth of productivity and real hourly compensation in manufacturing was robust until the 1973–79 period. The productivity slowdown in manufacturing was not as severe as that in nonfarm business as a whole.
- Manufacturing productivity growth rates from the 1980s and after surpassed the sector's earlier growth rates. Real hourly compensation growth, in contrast, slowed greatly in the 1980s and has not kept up with productivity gains.

8. Changes in price differences, labor share, and the compensation-productivity gap, manufacturing sector, selected periods, 1949–2008



- The compensation–productivity gap in the manufacturing sector emerged after 1973.
- The widening gap in the 1980s and 1990s reflected growing differences between the CPI and the IDP. From 2000 to 2008, the decline in labor share had a large effect on the compensation–productivity gap.

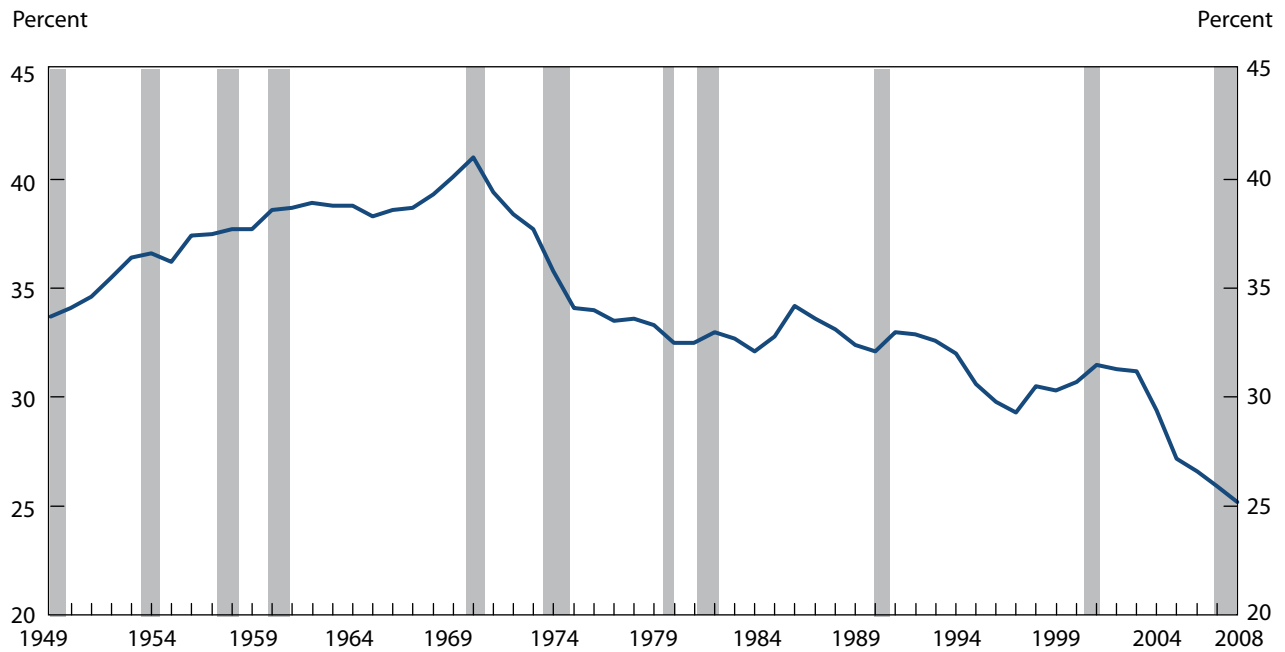
9. Price indexes, manufacturing sector, 1949–2008



NOTE: The shaded bars denote National Bureau of Economic Research (NBER)-designated recessions.

- The same consumer price index accounts for inflation in compensation in both all nonfarm business and the manufacturing sector. The implicit price deflator for manufacturing output differs from that for nonfarm business output. The CPI and the manufacturing IPD tracked each other closely until the 1980s.
- As the manufacturing sector faced growing international competition, prices of manufactured goods grew more slowly than the CPI and, at times, fell.

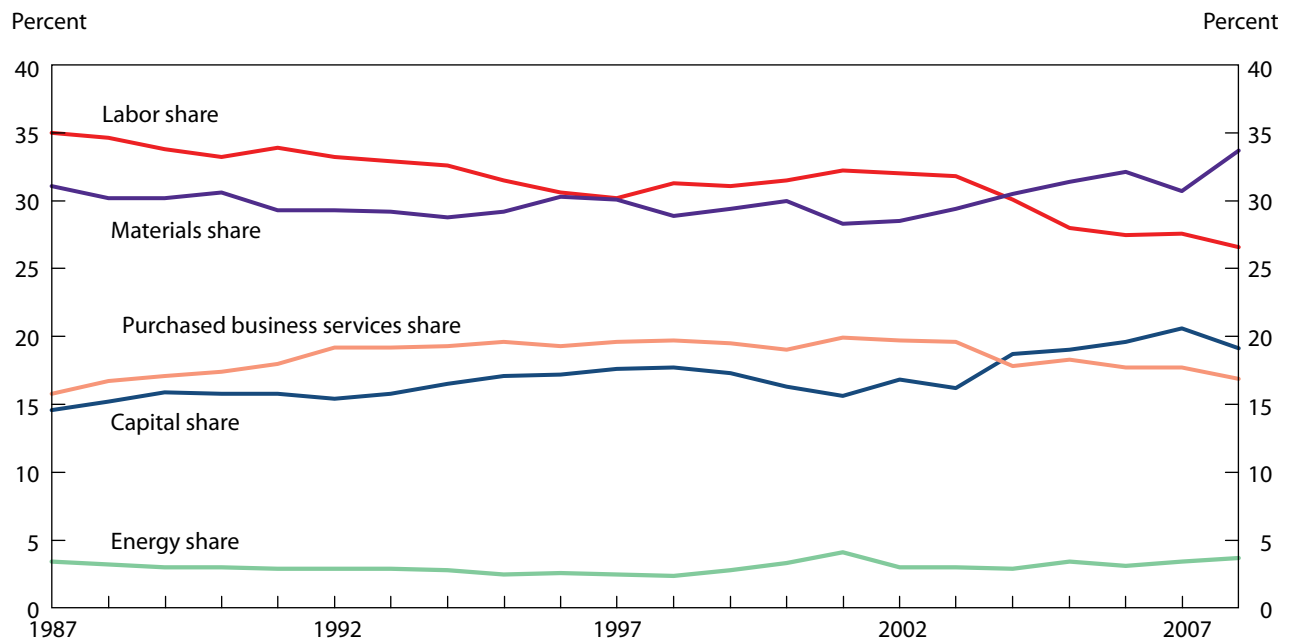
10. Labor share of manufacturing sector output, 1949–2008



NOTE: The shaded bars denote National Bureau of Economic Research (NBER)-designated recessions.

- Unlike nonfarm business output, which represents the value added by capital and labor, manufacturing sector output counts final output sold to U.S. consumers, output sold as exports, *and* output sold to businesses in other sectors. Furthermore, manufacturing sector input expands nonlabor costs to include energy, materials, and services provided as intermediate inputs from other sectors and from imports. Thus, labor costs, or compensation, in manufacturing account for a smaller share of sectoral output compared with labor costs for all nonfarm businesses.
- Labor share grew quickly in manufacturing during the 1950s and 1960s before falling precipitously during the early 1970s and from 2003 through 2008.

11. Input cost shares as a percent of manufacturing sector output, 1987–2008



- According to multifactor productivity measures, labor share of manufacturing output is slightly higher in this chart than in chart 10, due to a small difference in methods. Nonetheless, the same pattern of declining labor share can be seen from 1987 to 2008.
- The nonlabor inputs to multifactor productivity in manufacturing are capital, energy, materials, and purchased business services. The decline in labor share during the 1990s coincided with a falloff in materials share, whereas purchased business services and capital investments, such as information technology, expanded. The shift in expenditures reflected a shrinking manufacturing sector that reorganized production to become more capital intensive. Since 2002, however, the share of materials, which includes imported intermediate inputs, has expanded, contributing to the further decline of labor share.