

*Employment outlook: 2000–10***The U.S. economy to 2010**

*Domestic growth with continued high productivity, low unemployment rates, and strong foreign markets characterize the expected outlook for the coming decade*

Betty W. Su

The Bureau of Labor Statistics (BLS, the Bureau) projections for the U.S. economy during the 2000–10 decade reflect continued growth. Gross domestic product (GDP) is expected to reach \$12.8 trillion in chained 1996 dollars by the end of the decade, an increase of \$3.6 trillion over the period.<sup>1</sup> Rising by an average annual rate of 3.4 percent, GDP is projected to grow faster than the 3.2-percent annual rate of growth over the preceding 10-year period, from 1990 to 2000. Slower growth of civilian household employment, from 1.3 percent a year during the 1990–2000 period to 1.1 percent from 2000 to 2010, is expected to result in an increase of 16.2 million employees over the latter period, slightly less than the increase of 16.4 million employees between 1990 and 2000. The employment projection is accompanied by an assumed unemployment rate of 4.0 percent in 2010, the same as in 2000. To best understand how these projections relate to the U.S. economy, it is helpful to examine the effects of major economic events that took place over the past four decades.

During the decade of the 1960s, labor productivity grew at an annual average rate of 2.9 percent, spurred by the aerospace program and strong defense-related demand. During the 1970s, labor productivity growth slowed to 1.8 percent annually as businesses struggled to deal with skyrocketing petroleum prices, energy shortages, sharp cutbacks in defense spending, and a deemphasis of aerospace research programs. The

1980s were marked by even slower productivity growth—1.5 percent each year over the decade—as large expenditures by businesses on computers and other technologies seemed to have no impact on the statistics and as significant corporate restructuring (downsizing, contracting out, and so forth) worked through the economy. In the early part of the 1990s, the economy moved into a recession, further muting productivity growth, but the stage was set for the longest sustained recovery in the post-World War II economy.

At the end of the 1990–91 recession, the Federal budget faced a \$215 billion deficit that increased further to \$298 billion in 1992. Deficit control policies and selective economic stimulation in the 1990s resulted in a budget surplus in 1998 for the first time since 1969, an unemployment rate of 4.0 percent in 2000 (the lowest in the past three

The BLS projections presented in this issue were completed prior to the tragic events of September 11. While there have been numerous immediate economic impacts, the nature and severity of longer term impacts remain unclear. At this time, it is impossible to know how individual industries or occupations may be affected over the next decade. The Bureau will continue to review its projections and, as the long-term consequences of September 11 become clearer, will incorporate these effects into subsequent releases of the labor force, industrial, and occupational outlook.

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decades), moderate inflation, and rapid productivity growth at an average of 2.5 percent a year between 1995 and 2000, an increase over the 1.5-percent figure posted between 1990 and 1995. The strong growth in production, a maturing labor force, businesses becoming increasingly successful in the global marketplace, and relatively tight labor markets unaccompanied by inflationary pressures contribute to an optimistic vision for the U.S. economy during the first decade of the next century.<sup>2</sup>

The outlook for the 2000–10 period presented in this article includes projections of demand, income growth, employment, and labor productivity. Each section of the article describes the projections in the context of trends over the previous 10-year period. The last two sections discuss the macroeconomic model, the major assumptions underlying the aggregate economic projections, and the sensitivity of BLS economic projections to those assumptions.

## Real demand GDP and its components

*Personal consumption expenditures.* Personal consumption spending, which makes up two-thirds of economic activity, is the largest component of demand. During the past four decades, the growth of consumer spending reflected the interaction of many factors that influenced consumers' decisions. Among these factors, increasing affluence, changing demographics, technological innovations, and changing tastes and lifestyles were particularly important. Affected by the wave of baby boomers moving through the population beginning in the 1960s, consumer spending increased as a share of GDP, growing from 64.8 percent in 1970 to 65.2 per-

cent in 1980 and 66.7 percent in 1990. Rising disposable incomes during these periods supplied the resources necessary to support the expansion in consumption. As consumers got into the spending habit, however, increases in personal consumption were more often made at the expense of the savings rate, which dropped from a high of 10.2 percent in 1980 to 7.8 percent by 1990. (See tables 1 and 2.)

During the 1990–95 period, consumer spending grew at 2.6 percent per year, following a 3.4-percent annual growth rate over the 1980–90 period. Beginning in 1996, with consumers buoyed by a number of factors, including the thriving job market, steady incomes, low interest rates, low inflation, and increased wealth from rising asset prices, spending accelerated to its fastest pace in more than a decade. Consumption expenditures grew by 4.6 percent yearly from 1996 to 2000, although consumers turned cautious in late 2000, due largely to losses in wealth from stock price declines. Nevertheless, the personal consumption expenditures share of GDP increased by 0.8 percentage point within just 4 years, from 67.0 percent in 1996 to 67.8 percent in 2000. Mirroring the expansion in consumption, the annual savings rate dropped to 1.0 percent in 2000, the lowest ever in history.<sup>3</sup>

Consumer demand is projected to grow at an average annual rate of 3.5 percent from 2000 to 2010, a slight increase over the 3.4-percent rate posted during the preceding 10-year period. The 3.5-percent rate is slightly greater than the projected 3.4-percent growth for GDP over the same span. As a result, consumption expenditures are anticipated to amount to 68.5 percent of GDP in 2010, a share that is 0.7 percentage point higher than in 2000. Real disposable income is projected to grow at a 3.5-percent annual rate between 2000 and

**Table 1.** Gross domestic product by major demand category, 1980, 1990, 2000, and projected 2010

Category	Billions of chained 1996 dollars				Percent distribution				Average annual rate of change		
	1980	1990	2000	2010	1980	1990	2000	2010	1980–90	1990–2000	2000–10
Gross domestic product .....	\$4,900.9	\$6,707.9	\$9,224.0	\$12,835.6	100.0	100.0	100.0	100.0	3.2	3.2	3.4
Personal consumption expenditures .....	3,193.0	4,474.5	6,257.8	8,786.5	65.2	66.7	67.8	68.5	3.4	3.4	3.5
Gross private domestic investment .....	655.3	907.3	1,772.9	2,953.8	13.4	13.5	19.2	23.0	3.3	6.9	5.2
Exports .....	333.4	575.7	1,133.2	2,393.7	6.8	8.6	12.3	18.6	5.6	7.0	7.8
Imports .....	326.3	632.2	1,532.3	3,282.7	6.7	9.4	16.6	25.6	6.8	9.3	7.9
Federal defense consumption expenditures and gross investment .....	292.7	443.2	349.0	392.7	6.0	6.6	3.8	3.1	4.2	-2.4	1.2
Federal nondefense consumption expenditures and gross investment .....	134.7	163.0	196.7	234.7	2.7	2.4	2.1	1.8	1.9	1.9	1.8
State and local consumption expenditures and gross investment .....	595.1	781.1	1,026.3	1,307.5	12.1	11.6	11.1	10.2	2.8	2.8	2.5
Residual <sup>1</sup> .....	22.9	-4.7	20.4	49.6	.5	-.1	.2	.4	...	...	...

<sup>1</sup> The residual is calculated as real gross domestic product, plus imports, less other components.

SOURCES: Historical data, Bureau of Economic Analysis; projected data, Bureau of Labor Statistics.

**Table 2. Personal income, 1980, 1990, 2000, and projected 2010**

Category	Billions of current dollars				Percent distribution				Average annual rate of change		
	1980	1990	2000	2010	1980	1990	2000	2010	1980-90	1990-2000	2000-10
<b>Sources</b>											
Personal income .....	\$2,323.9	\$4,903.2	\$8,319.2	\$14,160.5	100.0	100.0	100.0	100.0	7.8	5.4	5.5
Labor income .....	1,562.9	3,144.6	5,371.4	9,203.3	67.3	64.1	64.6	65.0	7.2	5.5	5.5
Disbursements of											
wages and salaries .....	1,377.5	2,754.6	4,837.2	8,397.8	59.3	56.2	58.1	59.3	7.2	5.8	5.7
Private industries .....	1,116.2	2,237.9	4,068.8	7,274.2	48.0	45.6	48.9	51.4	7.2	6.2	6.0
Government .....	261.3	516.7	768.4	1,123.6	11.2	10.5	9.2	7.9	7.1	4.0	3.9
Other labor income .....	185.4	390.0	534.2	805.5	8.0	8.0	6.4	5.7	7.7	3.2	4.2
Group health contributions .....	61.0	188.6	298.0	521.5	2.6	3.8	3.6	3.7	11.9	4.7	5.8
Other .....	124.4	201.4	236.2	284.0	5.4	4.1	2.8	2.0	4.9	1.6	1.9
Business-related personal income .....	559.3	1,368.0	2,236.4	3,547.4	24.1	27.9	26.9	25.1	9.4	5.0	4.7
Proprietors' income .....	177.6	381.0	715.0	1,211.2	7.6	7.8	8.6	8.6	7.9	6.5	5.4
Rental income .....	31.3	49.1	141.6	186.8	1.3	1.0	1.7	1.3	4.6	11.2	2.8
Personal dividend income .....	64.0	165.4	379.2	552.1	2.8	3.4	4.6	3.9	10.0	8.7	3.8
Personal interest income .....	286.4	772.5	1,000.6	1,597.3	12.3	15.8	12.0	11.3	10.4	2.6	4.8
Transfer payments .....	279.1	594.4	1,069.1	1,991.0	12.0	12.1	12.9	14.1	7.9	6.0	6.4
Less social insurance contributions .....	-77.3	-203.7	-357.7	-581.3	-3.3	-4.2	-4.3	-4.1	10.2	5.8	5.0
<b>Uses</b>											
Personal income .....	2,323.9	4,903.2	8,319.2	14,160.5	100.0	100.0	100.0	100.0	7.8	5.4	5.5
Personal consumption .....	1,762.9	3,831.5	6,728.4	11,707.2	75.9	78.1	80.9	82.7	8.1	5.8	5.7
Tax and nontax payments .....	304.2	609.7	1,288.2	1,916.5	13.1	12.4	15.5	13.5	7.2	7.8	4.1
Personal interest payments .....	49.4	115.8	205.3	375.5	2.1	2.4	2.5	2.7	8.9	5.9	6.2
Transfers to foreigners .....	1.9	12.0	29.6	56.2	.1	.2	.4	.4	20.6	9.4	6.6
Personal savings .....	205.6	334.4	67.7	104.9	8.8	6.8	.8	.7	5.0	-14.8	4.5
<b>Addenda</b>											
Disposable personal income .....	2,019.8	4,293.6	7,031.0	12,243.9	...	...	...	...	7.8	5.1	5.7
Disposable personal income, chained 1996 dollars .....	3,658.0	5,014.2	6,539.2	9,189.1	...	...	...	...	3.2	2.7	3.5
Per capita disposable income .....	8,859	17,153	25,528	40,768	...	...	...	...	6.8	4.1	4.8
Per capita disposable income, chained 1996 dollars .....	16,045	20,032	23,742	30,597	...	...	...	...	2.2	1.7	2.6
Savings rate (percent) .....	10.2	7.8	1.0	.9	...	...	...	...	-2.7	-18.8	-1

SOURCES: Historical data, Bureau of Economic Analysis; projected data, Bureau of Labor Statistics.

2010, 0.8 percentage point higher than the rate for 1990–2000.

*Consumer durable goods.* Consumer spending on long-lasting items, such as motor vehicles, personal computers, and household furnishings, is highly cyclical. During the past two decades, particularly in the 1990s, the U.S. economy experienced the most sustained spending on big-ticket items ever, bringing household outlays for durable goods to a post-war high. Real spending on durables increased from a 5.7-percent annual rate of growth in the 1980–90 period to 6.3 percent per year between 1990 and 2000. (See table 3.) Over the coming decade, with a projected rise in family income—a key to determining future spending trends—durable goods are still expected to be the fastest growth sector, increasing at an average annual rate of 5.0 percent in the 2000–10 projection horizon.

*Light vehicles.* Over the past 5–10 years, consumers shifted their relative preferences from cars to minivans and sport utility vehicles, and the U.S. automobile industry witnessed a dramatic change in light-truck offerings (a category that

includes sport utility vehicles and minivans, as well as small pickup trucks). Demand for light trucks jumped sharply, and the market share of the industry increased rapidly, from 34.7 percent of total light-vehicle sales in 1990 to 44.0 percent in 1995 and 51.7 percent in 2000. From 1995 to 2000, consumer spending on light vehicles grew an average of 7.9 percent per year. Over the next decade, the robust gain in auto sales is expected to ease, but remain strong. Spending on light vehicles as a whole is projected to grow at a rate of 3.5 percent yearly between 2000 and 2010, while consumer spending on light trucks is still anticipated to be well above spending on cars.

*Personal computers and software.* During the past decade, technological innovations resulted in a proliferation of newly available goods and services, including personal computers and software. Real personal computer spending grew at a robust 52.1 percent per year from 1990 to 2000, with about 58 percent of all U.S. homes owning at least one computer in 2000. Over the decade to come, increasing worldwide use of the Internet and interest in electronic commerce will fuel the demand for computers, although growth will likely not reach

the level of the previous decade. Expenditures for personal computers are projected to grow at an annual rate of 22.1 percent throughout the projection period, with real consumption spending on computers by households increasing from \$108.8 billion in 2000 to \$802.4 billion in 2010, or an increase in share from 12.1 percent to 55.1 percent of total spending on durable goods over the period.

It is probably more accurate to present personal computer sales in nominal terms, because of their price behavior. Already on the decline for more than a decade, computer prices fell by nearly one-half in the 1996–2000 period. Personal consumption expenditures on computers had grown 13.9 percent annually in nominal terms between 1990 and 2000. From 2000 to 2010, spending on personal computers is projected to increase 8.0 percent per year, and as a result, nominal expenditures on computers are expected to reach \$55 billion by 2010,

up from \$25.5 billion in 2000. This large discrepancy between the real (in terms of chained 1996 dollars) and nominal expenditures on computers highlights the expected substantial price deflation over the 2000–10 period, as the intense domestic and global competition and rapid technological improvement of the previous decade are anticipated to continue.

As computer prices drop and use of the Internet expands via online mass-marketing services, the increasing sales of personal computers to households will stimulate demand for consumer software. Spending on consumer software for education, family management, and entertainment purposes reached \$17.8 billion in 2000, up from \$500 million in 1990. By 2010, the figure is expected to rise to \$36.3 billion, with a 7.4-percent rate of growth per year between 2000 and 2010.

*Furniture.* Between 1990 and 2000, consumer spending on

**Table 3.** Personal consumption expenditures, 1980, 1990, 2000, and projected 2010

Category	Billions of chained 1996 dollars				Average annual rate of change		
	1980	1990	2000	2010	1980–90	1990–2000	2000–10
Personal consumption expenditures .....	\$3,193.0	\$4,474.5	\$6,257.8	\$8,786.5	3.4	3.4	3.5
Durable goods .....	279.8	487.1	895.5	1,455.4	5.7	6.3	5.0
New light vehicles .....	88.3	159.9	218.6	307.3	6.1	3.2	3.5
Other motor vehicles and parts .....	54.1	86.2	129.3	176.2	4.8	4.1	3.1
Personal computers .....	.0	1.6	108.8	802.4	( <sup>1</sup> )	52.1	22.1
Software .....	.0	.5	17.8	36.3	( <sup>1</sup> )	43.7	7.4
Furniture .....	95.5	160.4	294.6	483.2	5.3	6.3	5.1
Ophthalmic products .....	6.2	16.1	20.4	27.7	10.1	2.4	3.1
Other durable goods .....	53.5	80.8	152.9	256.1	4.2	6.6	5.3
Nondurable goods .....	1,065.8	1,369.6	1,849.9	2,635.5	2.5	3.1	3.6
Food and beverages .....	585.4	722.4	881.3	1,102.8	2.1	2.0	2.3
Clothing and shoes .....	124.0	197.2	335.3	511.0	4.7	5.5	4.3
Gasoline and motor oil .....	94.8	113.1	136.6	169.8	1.8	1.9	2.2
Fuel oil and coal .....	17.7	13.1	13.8	15.5	-3.0	.6	1.1
Tobacco products .....	65.6	52.0	42.8	46.5	-2.3	-1.9	.8
Drugs and medicines .....	54.5	80.3	139.9	316.6	4.0	5.7	8.5
Other nondurable goods .....	138.9	194.3	305.7	497.5	3.4	4.6	5.0
Services .....	1,858.4	2,616.2	3,527.7	4,784.5	3.5	3.0	3.1
Housing .....	541.5	696.2	850.1	1,070.2	2.5	2.0	2.3
Household operation .....	202.9	259.8	377.6	579.2	2.5	3.8	4.4
Electricity .....	66.7	83.2	103.9	137.7	2.2	2.2	2.9
Natural gas .....	31.1	29.5	32.8	30.8	-5	1.1	-6
Telephone .....	40.0	62.6	141.8	296.2	4.6	8.5	7.6
Other .....	66.2	85.9	100.8	142.5	2.6	1.6	3.5
Transportation services .....	124.7	173.4	251.3	318.5	3.4	3.8	2.4
Motor vehicle leases .....	—	5.5	37.6	49.1	( <sup>2</sup> )	21.2	2.7
Other .....	—	168.1	213.6	269.2	( <sup>2</sup> )	2.4	2.3
Medical services .....	487.6	710.9	903.9	1,174.9	3.8	2.4	2.7
Recreation services .....	79.7	145.0	227.0	408.1	6.2	4.6	6.0
Personal business services .....	242.8	363.2	554.8	759.0	4.1	4.3	3.2
Financial services .....	94.4	154.2	222.7	292.5	5.0	3.7	2.8
Other .....	147.4	209.0	332.4	467.4	3.6	4.7	3.5
Other services .....	170.8	267.0	362.3	488.3	4.6	3.1	3.0
Residual <sup>3</sup> .....	-35.6	-20.5	-68.7	-789.4	...	...	...

<sup>1</sup> Undefined because of denominator with value zero.

<sup>2</sup> Not applicable.

<sup>3</sup> The residual is the difference between the first line and the sum of the most detailed lines.

NOTE: Dash indicates data not available.

SOURCES: Historical data, Bureau of Economic Analysis; projected data, Bureau of Labor Statistics.

furniture was exceptionally strong. Brisk home sales during that period, especially from late 1998 through 2000, contributed to strong demand. In the long run, demographics play an important role in the demand for household furniture, which is projected to continue to grow strongly, but not as rapidly as during the 1990–2000 period. Those in the 35–44 age group—the largest segment of the population, which tends to spend the most on home furnishings—reached a peak in 2000. Estimates based on projections of the current population indicate that, beginning in 2001, the group will reverse the trend, and its spending on furniture will gradually decline. By 2010, the 45–54 age group will replace the 35–44 age group as the largest 10-year age cohort.<sup>4</sup>

The household formation rate is expected to hold at 1.1 percent annually over the projection period, the same rate experienced during 1990–2000.<sup>5</sup> For these reasons, an annual rate of growth of 5.1 percent is projected for spending on household furniture over the 2000–10 period, compared with 6.3 percent during 1990–2000.

*Ophthalmic products.* Personal consumption expenditures for ophthalmic products have been increasing due to the demographic effects of an aging population that requires more eyewear than younger age groups do. In addition, growing income may allow consumers to buy multiple pairs of contact lenses or eyeglasses. Presently, laser vision corrections are used by a relatively small share of the population, but this new high-tech eye surgery is likely to become more popular in the future. In turn, laser surgery would dampen demand for eyewear, at least for some of the population. A net annual rate of growth of 3.1 percent is projected for spending on eyewear over the 2000–10 period, compared with 2.4 percent between 1990 and 2000.

*Consumer nondurable goods.* During the past several decades, expenditures for nondurable goods, such as food and clothing, have increased at a significantly slower pace than spending on durable goods. As family incomes rise, spending on these short-term consumable necessities also rises, up to a point, after which spending tends to increase less rapidly than rises in income, although the latter increases do enhance demand for higher quality products.

*Food and clothing.* Over the past 10 years, convenient prepacked food items, as well as bottled water, grew considerably in popularity. Expenditures on the largest nondurable category, food and beverages, are projected to increase 2.3 percent annually from 2000 to 2010, 0.3 percentage point faster than the annual growth rate posted for the 1990–2000 period. By contrast, spending on clothing and shoes as a share of total nondurable goods has declined over time, reflecting decreases in relative prices. As a result, demand for clothing and shoes is expected to increase at a slower rate over the projec-

tion period. A 4.3-percent annual rate of growth is projected during the 2000–10 span, compared with 4.7 percent and 5.5 percent in the 1980–90 and 1990–2000 periods, respectively.

*Gasoline and fuel oil.* Spending on gasoline for automobiles and on fuel oil for home heating grew at a relatively slow pace during the 1970s and early 1980s, due to high energy costs. Those same high costs led the way, however, toward energy-conserving homes, appliances, and autos, further conserving our scarce energy resources. In contrast, during the 1990s, demand for gasoline gradually increased, spurred in large part by the rosy economy and by sharply falling gasoline prices. The trend of decelerating prices for fuel lasted almost the entire decade, until recent rises driven by increasingly tight supplies. Real consumption expenditures on gasoline and oil increased at 1.9 percent yearly between 1990 and 2000, compared with a 1.8-percent average annual growth rate for the 1980–90 period.

The BLS projection has assumed a moderately downward trend in both real and nominal imported oil prices over the 2000–10 period. Oil prices are projected to decline from a nominal \$27.68 or a real \$25.87 per barrel in 2000 to a nominal \$26.63 or a real \$20.19 per barrel in 2010, far below the 1980 peak of a nominal \$59.54 or a real \$33.97 per barrel.<sup>6</sup> As a result, personal consumption of gasoline and motor oil is projected to increase at a rate of 2.2 percent between 2000 and 2010, while expenditures for fuel oil and coal are projected to grow much more slowly—only 1.1 percent annually over the same period.

*Drugs and medicines.* People in the United States enjoy the best health care in the world, but it comes at a high price, and drugs are the fastest-growing piece of the country's medical bill. Between 1985 and 2000, drug expenditures more than doubled, from \$64 billion to \$139.9 billion. In the next decade, with millions of baby boomers pushing into their sixties, consumer spending on drugs is expected to provide a strong market and solid demand for both prescription drugs and over-the-counter medicines. Also, rising standards of living are expected to boost the demand for better health care and, in turn, to shift the demand toward newer and more expensive medications. As a result, demand for drugs and medicines is projected to grow rapidly, about 8.5 percent per year between 2000 and 2010, compared with the already high growth of 5.7 percent annually posted in the 1990–2000 period.

*Consumer services.* Over the past 30 years, expenditures for consumer services, such as housing and medical care, have represented the largest share of total consumption. For instance, the share of consumer spending allocated to services was about 55 percent in 1970 and increased to 58.2 percent in 1980 and 58.5 percent in 1990. In the past 3 years, consumer services' share of spending trimmed down slightly,

but still held steady between the 56- and 57-percent mark. With spending on consumer services projected to grow at a rate of 3.1 percent annually from 2000 to 2010, its share of total consumption is expected to be 54.5 percent in 2010, or more than one-third of total real GDP.

*Housing and household operation.* Demographics have a notable influence on housing services.<sup>7</sup> As the household formation rate slowed over the 1990–2000 decade, spending on housing services also slowed, growing at a rate that was 0.5 percentage point slower than during the 1980–90 period. In contrast, spending on household operation grew 1.3 percentage points faster from 1990 to 2000 than it did over the 1980–90 period. Among the categories of household operation, electricity demand outpaced demand for natural gas during the past 10 years.<sup>8</sup> This is attributed to a significant jump in new homes equipped with central air-conditioning and heating, along with a relatively prolonged hiatus on new natural-gas installations during the 1980s. For nonenergy household operations, expenditures on telephone services contributed the strongest growth, largely reflecting increases in the share of U.S. households with telephones, in the average number of lines per household, and in the use of cellular phones. From 1990 to 2000, demand for telephone services rose at an annual 8.5-percent rate of growth.

Over the long run, as noted earlier, demographics largely determine the demand for housing services. The current population projection implies that the number of households will grow at a rate of 1.1 percent from 2000 to 2010, only a slight decline from the 1.2 percent experienced during the 1990–2000 period. As a result, a stable rate of growth for housing services is foreseen over the projection horizon—about 2.3 percent per year between 2000 and 2010, compared with 2.0 percent posted in 1990–2000. In contrast, a faster growth is anticipated for the category of household operation expenditures—about 4.4 annually over the projection horizon, compared with 3.8 percent during 1990–2000. In the category of household operation, telephone services will likely continue its past trend, growing at a rapid rate of 7.6 percent per year over the 2000–10 period.

*Medical services.* A major contributor to overall growth in consumer spending for services is the growth of medical-care expenditures. Consumer spending for medical services increased 3.8 percent per year during the 1980–90 period, resulting in medical services overtaking housing services as the largest category of personal consumption expenditures for the first time during the 1990s. Over the past decade, the rapid displacement of traditional fee-for-service plans by managed-care plans created a degree of price stability and slowed the rate at which costs of health care were rising. In addition, the Balanced Budget Act of 1997, which reformed medicare and medicaid payments to health care providers,

assisted in keeping the rate of growth for health care costs low. By contrast, the growing number of elderly in the population, as well as advances in medical technology, has resulted in a greater demand for health services, particularly home care and outpatient services. Spending on medical services grew at a slower, but still respectable, rate of 2.4 percent per year between 1990 and 2000. Over the coming 10 years, due to the importance of demographic factors, spending on medical services is expected to expand at a rate of 2.7 percent annually.

*Recreation services and personal business services.* As incomes rise, spending on recreation and entertainment services also is increasing. By the same token, expenditures for personal business services, such as investment counseling and legal and accounting services, have been growing in importance, largely reflecting the increased affluence of consumers and the burgeoning array of financial management and legal services now available. In the next decade, spending on recreation services is expected to become a substantial source of total services growth, at a rate of 6.0 percent per year between 2000 and 2010. Spending on personal business services also is expected to exhibit strong growth, 3.2 percent per year from 2000 to 2010.

*Gross private domestic (business) investment.* This component of GDP consists of investment spending for equipment and software in nonresidential structures,<sup>9</sup> purchases of nonresidential structures, purchases of residential structures, and changes in business inventories. Historically, private business investment is one of the most volatile elements of final output, responding to the business cycle and to shifting interest rates and inflation. During the previous two recessions, private investment declined to 12.5 percent of GDP in 1982 and, further, to 12.4 percent in 1991. Nevertheless, a strong economy boosted investment's share of GDP to 19.2 percent by 2000, an average growth rate of 6.9 percent a year from 1990 to that year, compared with growth in investment of 3.3 percent between 1980 and 1990. (See table 1.)

With good profitability, technological innovation, and solid growth in demand, the BLS projections indicate that investment in equipment and software will grow at a robust rate of 7.4 percent per year from 2000 to 2010. (See table 4.) Purchases of nonresidential structures are expected to grow somewhat faster than the historical pace: 1.9 percent annually over the projection period, compared with 1.5 percent between 1990 and 2000. Demand for fixed residential investment is projected to retreat and settle down after its 2000 record high, to a still healthy 2.3-percent average annual growth rate. Business investment, in general, is expected to continue to be a great contributor to U.S. economic growth over the next decade, at a rate of 6.2 percent per year for the 2000–10 period.

**Table 4.** Gross private domestic investment, 1980, 1990, 2000, and projected 2010

Category	Billions of chained 1996 dollars				Average annual rate of change		
	1980	1990	2000	2010	1980-90	1990-2000	2000-10
Gross private domestic investment .....	\$655.3	\$907.3	\$1,772.9	\$2,953.8	3.3	6.9	5.2
Fixed nonresidential investment .....	466.4	641.7	1,350.7	2,461.6	3.2	7.7	6.2
Equipment and software .....	262.2	415.7	1,087.4	2,216.3	4.7	10.1	7.4
Light vehicles .....	31.9	51.9	125.5	177.3	5.0	9.2	3.5
Computers .....	1.2	14.2	290.3	1,195.2	28.1	35.2	15.2
Software .....	10.6	45.9	187.6	613.0	15.8	15.1	12.6
Communication equipment .....	29.1	43.0	131.4	203.6	4.0	11.8	4.5
Other equipment .....	264.2	282.2	433.8	655.9	.7	4.4	4.2
Nonresidential structures .....	223.2	236.1	272.8	330.1	.6	1.5	1.9
Public utilities .....	47.0	33.0	48.5	50.3	-3.5	3.9	.4
Mining and exploration .....	36.0	21.3	23.5	26.2	-5.1	1.0	1.1
Building and other structures .....	133.0	181.9	201.8	254.3	3.2	1.0	2.3
Fixed residential investment .....	210.1	253.5	371.4	464.5	1.9	3.9	2.3
Residential structures .....	205.9	247.3	361.8	450.1	1.8	3.9	2.2
Landlord durables .....	4.3	6.2	9.6	15.0	3.8	4.5	4.6
Change in business inventories .....	-10.5	16.5	50.6	58.6	...	11.8	1.5
Residual <sup>1</sup> .....	-97.2	-36.0	-91.5	-745.7	...	...	...

<sup>1</sup> The residual is the difference between the first line and the sum of the most detailed lines.

SOURCES: Historical data, Bureau of Economic Analysis; projected data, Bureau of Labor Statistics.

**Business computers.** Over the past 10 years, innovations in the computer industry, as well as in other high-tech industries, had a fundamental impact on the U.S. economy. Computers have been facilitating change in business practices for some time, but the explosive growth in the production and use of information technology went much further during the past decade. Spending on business computers increased 35.2 percent per year over the 1990–2000 period. This robust historical trend is expected to continue over the next 10 years. With rapidly declining prices, companies will replace existing and depreciating computers with more advanced and sophisticated models. Equally important, the development of global information infrastructures through the expansion of the Internet, of local area networks (LANs), and of “intranets” will be a powerful force fueling continuing growth for the business computer industry. Demand for business computers is expected to remain high by all standards, with a projected real growth rate of 15.2 percent annually for the 2000–10 period.

**Software.** The rapid growth of the Internet and the parallel emergence of e-commerce are having a profound effect on the software market. Increasing business use of the Internet is influencing the development of existing products and driving the creation of new ones, such as web page design. Business investment in software increased 15.1 percent per year between 1990 and 2000. As businesses continue to enhance technology in order to become fully efficient, investment in software is expected to show continued strong growth in the

next decade, at a rate of 12.6 percent per year from 2000 to 2010.

**Communication equipment.** During the past decade, investment in technology—in particular, purchases of communication equipment—posted a banner performance, with an 11.8-percent rate of growth between 1990 and 2000. While the communication industry is outpacing most other industries in terms of innovation, the wireless equipment sector is also a significant contributor to the trend. With future Internet access clearly anticipated to have a significant wireless element, investment in communication equipment is expected to continue to grow. The next decade is projected to see a respectable 4.5-percent rate of growth in communication equipment.

**Nonresidential structures.** Between 1980 and 1990, nonresidential building construction suffered greatly from the overbuilding of office and commercial buildings. For the most part, the oversupply has disappeared since 1988. Accordingly, the BLS projection envisions a resumption in the growth of nonresidential construction, at a rate of 1.9 percent annually over the 2000–10 period, changing only modestly from patterns established in the decade of the 1990s. The largest subcategory of nonresidential construction, buildings and other structures, is anticipated to grow faster than the overall category, with an average annual growth rate of 2.3 percent during the same 10-year projection interval, as the 1998 highway bill continues to encourage spending. In contrast, the projections for 2000–10 indicate lackluster investment in two other

subcategories: public utilities, with a slow growth of 0.4 percent per year, and mining and exploration, with an annual growth of 1.1 percent.

*Fixed residential structures.* Housing markets have been surprisingly strong during the past decade. With the expanding economy, rising family wealth, and relatively low interest rates, housing starts reached a record high of 1.65 million units in 1999, from a low of 1.01 million units in 1991. Even more impressive in 2000 was the 67.4 percent of American families that owned a home, up from 63.9 percent in 1990.

While interest rates clearly influence the short-term timing of home purchases, demographics are the primary determinant of long-term housing activity. The baby bust that occurred in the United States between 1965 and 1976 will lead to declines in the 35–44-year-old population by 2010, traditionally thought of as the prime home-buying age group. As a result, housing starts are expected to rise only modestly, to 1.79 million units in 2010, resulting in investment in residential

structures growing at a slower 2.3 percent per year from 2000 to 2010, compared with 3.9 percent for the 1990–2000 period.

*Exports and imports.* Globalization and international competition have played an important role in U.S. economic activity. During the 1990s, increasing exports drove GDP growth. So did imports: The strong U.S. dollar and falling foreign commodity prices in emerging markets helped keep the Nation's inflation low and combined with other factors to trigger strong growth in consumer spending. However, increased globalization has also brought new challenges to the U.S. economy, including a widening of the trade deficit in total goods and services, which ballooned to a record \$364.0 billion in 2000 in nominal terms, or \$399.1 billion in real dollars, up from the 1990 figure of \$71.4 billion in nominal terms, or \$56.5 billion in real dollars. (See table 5.) As a share of GDP, exports increased from 6.8 percent in 1980 to 8.6 percent in 1990 and 12.3 percent in 2000, while imports' share of GDP increased from 6.7 percent in 1980 to 9.4 percent in 1990 and

**Table 5.** Exports and imports of goods and services, 1980, 1990, 2000, and projected 2010

Category	Billions of chained 1996 dollars				Average annual rate of change		
	1980	1990	2000	2010	1980-90	1990-2000	2000-10
Exports of goods and services .....	\$333.4	\$575.7	\$1,133.2	\$2,393.7	5.6	7.0	7.8
Goods .....	238.9	393.2	836.1	1,821.2	5.1	7.8	8.1
Foods, feeds, and beverages .....	44.7	44.4	60.0	91.4	-1	3.1	4.3
Industrial supplies and materials .....	86.9	111.7	168.2	228.4	2.5	4.2	3.1
Capital goods, except autos .....	56.0	124.8	394.9	1,123.1	8.3	12.2	11.0
Computers .....	1.0	12.3	85.6	406.0	28.5	21.4	16.8
Civilian aircraft and parts .....	26.9	40.9	43.1	78.2	4.3	.5	6.1
Other .....	48.5	79.1	271.5	740.4	5.0	13.1	10.6
Autos and parts .....	28.3	39.8	78.3	154.5	3.5	7.0	7.0
Consumer goods .....	25.1	48.1	89.8	182.7	6.7	6.4	7.4
Other merchandise exports .....	14.8	32.4	45.9	103.3	8.1	3.6	8.4
Services .....	89.0	183.4	299.3	591.7	7.5	5.0	7.1
Residual <sup>1</sup> .....	-31.8	-16.5	-8.6	-182.9	...	...	...
Imports of goods and services .....	326.3	632.2	1,532.3	3,282.7	6.8	9.3	7.9
Goods .....	260.6	497.9	1,315.6	2,954.5	6.7	10.2	8.4
Foods, feeds, and beverages .....	20.9	30.4	49.4	61.9	3.8	5.0	2.3
Industrial supplies and materials .....	118.1	142.4	254.5	331.6	1.9	6.0	2.7
Petroleum and products .....	51.5	59.5	86.0	96.6	1.4	3.8	1.2
Other .....	55.0	83.6	167.9	234.8	4.3	7.2	3.4
Capital goods, except autos .....	18.5	88.8	451.7	1,428.6	17.0	17.7	12.2
Computers .....	.2	11.6	152.6	670.2	50.1	29.4	15.9
Civilian aircraft and parts .....	6.0	13.5	23.9	36.7	8.5	5.8	4.4
Other .....	19.1	68.9	279.3	824.0	13.7	15.0	11.4
Autos and parts .....	52.5	101.6	192.5	322.8	6.8	6.6	5.3
Consumer goods .....	49.8	112.8	293.5	858.9	8.5	10.0	11.3
Other merchandise imports .....	12.4	35.2	80.9	148.0	11.0	8.7	6.2
Services .....	65.6	136.6	218.7	352.8	7.6	4.8	4.9
Residual <sup>2</sup> .....	-6.7	-21.5	-12.6	-323.9	...	...	...
Trade deficit .....	7.1	-56.5	-399.1	-889.1	...	21.6	8.3

<sup>1</sup> The residual following the detailed categories for exports is the difference between the aggregate of "exports of goods and services" and the sum of the figures in the separate categories for exports of goods and services.

<sup>2</sup> The residual following the detailed categories for imports is the difference

between the aggregate of "imports of goods and services" and the sum of the figures in the separate categories for imports of goods and services.

SOURCES: Historical data, Bureau of Economic Analysis; projected data, Bureau of Labor Statistics.



**Table 6.** Federal Government receipts and expenditures, 1980, 1990, 2000, and projected 2010

Category	Billions of current dollars				Percent distribution				Average annual rate of change		
	1980	1990	2000	2010	1980	1990	2000	2010	1980-90	1990-2000	2000-10
Receipts .....	\$522.8	\$1,055.7	\$2,046.8	\$2,968.7	100.0	100.0	100.0	100.0	7.3	6.8	3.8
Personal tax and nontax payments .....	250.3	473.6	1,009.5	1,495.5	47.9	44.9	49.3	50.4	6.6	7.9	4.0
Corporate profits tax .....	70.3	118.1	234.7	232.3	13.5	11.2	11.5	7.8	5.3	7.1	-1
Contributions to social insurance .....	162.6	400.1	691.5	1,121.5	31.1	37.9	33.8	37.8	9.4	5.6	5.0
Indirect business tax .....	39.7	63.9	111.2	119.4	7.6	6.1	5.4	4.0	4.9	5.7	.7
Expenditures .....	576.6	1,228.7	1,828.3	2,731.7	100.0	100.0	100.0	100.0	7.9	4.1	4.1
Defense consumption .....	145.3	309.0	321.9	461.3	25.2	25.1	17.6	16.9	7.8	.4	3.7
Nondefense consumption .....	63.7	111.0	171.8	248.4	11.0	9.0	9.4	9.1	5.7	4.5	3.8
Transfer payments .....	223.8	455.3	779.3	1,404.4	38.8	37.1	42.6	51.4	7.4	5.5	6.1
To persons .....	219.0	445.4	765.3	1,393.0	38.0	36.2	41.9	51.0	7.4	5.6	6.2
Social Security .....	118.6	244.1	401.4	662.2	20.6	19.9	22.0	24.2	7.5	5.1	5.1
Medicare .....	35.6	107.9	215.9	517.5	6.2	8.8	11.8	18.9	11.7	7.2	9.1
Other .....	64.9	93.3	148.0	213.3	11.3	7.6	8.1	7.8	3.7	4.7	3.7
To foreigners .....	4.8	10.0	14.0	11.4	.8	.8	.8	.4	7.7	3.4	-2.0
Grants-in-aid .....	72.3	111.4	245.6	472.0	12.5	9.1	13.4	17.3	4.4	8.2	6.8
Medicaid .....	14.3	43.3	119.4	265.4	2.5	3.5	6.5	9.7	11.8	10.7	8.3
Other .....	58.1	68.1	126.2	206.6	10.1	5.5	6.9	7.6	1.6	6.4	5.0
Net interest paid .....	58.6	210.6	262.9	94.3	10.2	17.1	14.4	3.5	13.7	2.2	-9.7
Net subsidies .....	12.9	31.6	46.8	51.4	2.2	2.6	2.6	1.9	9.4	4.0	.9
Wage accruals less disbursements .....	( <sup>1</sup> )	.1	.0	.0	...	.0	.0	.0	...	...	...
Surplus/deficit .....	-53.7	-173.0	218.6	237.0	...	...	...	...	...	...	...
Surplus/deficit as percentage of gross domestic product ..	-1.9	-3.0	2.2	1.4	...	...	...	...	...	...	...

<sup>1</sup> Data not available.

SOURCES: Historical data, Bureau of Economic Analysis; projected data, Bureau of Labor Statistics.

jumped to 16.6 percent by 2000. (See table 1.)

In any long-term projections program, the international trade sector is the most difficult to predict. The key to the Bureau's 10-year outlook for U.S. trade is increasing global accessibility and international competition. With the world assumed to become more open to trade, the share of GDP accounted for by both exports and imports is expected to grow apace, and the dollar is expected to remain moderately strong throughout the projection period, but not so strong as to significantly weaken anticipated export growth.

Exports are projected to grow at a 7.8-percent annual rate between 2000 and 2010, compared with 7.0 percent per year during the 1990-2000 period. Exports of goods are expected to lead the way with an 8.1-percent annual rate of growth during the coming 10-year period, while exports of services are anticipated to grow at a rate of 7.1 percent. (See table 5.) Imports are projected to grow at a rate of 7.9 percent annually over the 2000-10 projection period, 0.1 percentage point higher than the projected growth rate for exports, but lower than the 9.3-percent annual rate of growth for imports over the 1990-2000 span. Imports of goods are expected to grow at 8.4 percent per year, and a 4.9-percent annual rate of growth is projected for imports of services during the 2000-10 period. As a result, net exports (exports minus imports) are projected

to continue to make a negative contribution to the aggregate demand, reaching \$889.1 billion in real terms by 2010. Both exports and imports are expected to increase their share of GDP by 2010, to 18.6 percent and 25.6 percent, respectively. (See table 1.)

*Exports of goods.* Exports of capital goods, led by the computer component, are anticipated to be the largest growth category of exports over the next decade. As noted earlier, with the assumed favorable foreign-trade conditions, combined with the more sophisticated global commercial and communications systems, the computer equipment market is expected to continue growing significantly, at a 16.8-percent rate annually over the 2000-10 period. The world market for other high-tech products, such as telecommunications equipment, also is expected to remain strong during the projection period, as developing countries continue to build their telecommunication infrastructures and developed countries invest in new technologies. Through 2010, all export categories are projected to exhibit strong growth. (See table 5.)

*Exports of services.* Exports of services have become increasingly important during the past two decades and have led to an increase in the real trade surplus in services from

\$46.8 billion in 1990 to \$80.6 billion in 2000. Strong demand for U.S.-built communications equipment is mirrored by strong demand for communications services. In addition, insurance and financial markets have become increasingly sophisticated in order to meet the needs of the business world emanating from increasing globalization. As a result, the Bureau projects a continued increase in the trade surplus in services, reaching \$238.9 billion in 2010. Still, the surplus in services will fail to offset the even larger deficit in goods.

*Imports of goods.* As with exports, the strongest growth in imports of goods is expected in the category of capital goods. Imports of foreign-built computers are projected to expand at a 15.9-percent average annual rate from 2000 to 2010. These computers will retain a large share of the U.S. computer equipment market as foreign suppliers use aggressive pricing to compete with U.S. companies. Crude-petroleum imports are projected to increase because of falling domestic production. The domestic share of crude-oil production is expected to continue to decline over the projection period, from 55.2 percent of total U.S. demand in 1990 and 38.7 percent in 2000 to an anticipated 34.2 percent by 2010. In turn, petroleum imports are expected to increase from 11.3 million barrels per day in 2000 to 12.7 million barrels in 2010. Oil prices in both real terms and nominal terms are assumed to fall below the recent peak by 2010, and demand for petroleum imports is projected to increase at a rate of 1.2 percent per year during the 2000–10 period.

*Imports of services.* Imports of services are expected to grow at a 4.9-percent rate annually over the 2000–10 period, continuing the past trend. As business transactions become more and more international, imported services will grow in response to increasing demands by U.S. companies for management consulting services and professional business services in overseas markets.

*Federal Government.* During most of the 1980s and the 1990s, the Federal Government faced a large deficit. The question of how to reduce that deficit was a centerpiece of discussion among economists and policymakers for more than 20 years. In nominal terms, the deficit grew from \$53.7 billion in 1980 to \$173.0 billion in 1990 and peaked at \$297.5 billion in 1992. Between 1993 and 1997, the deficit grew steadily smaller. After 28 years of deficit, in 1998, for the first time since 1969, the budget recorded a substantial surplus of \$43.8 billion. In the past 2 years, its surplus increased further, to \$119.2 in 1999 and then to \$218.6 in 2000. (See table 6.) The surplus accounted for 1.3 percent of nominal GDP in 1999 and 2.2 percent in 2000, its largest share of GDP in more than 40 years. This dramatic change is attributable to an increase in tax receipts from an expanding economy, on the one hand, and a decline in expenditures due to the Balanced Budget Act of

1996, on the other.

The macroeconomic model assumes that the Federal budget surplus will remain through the projection period, accounting for 1.4 percent of GDP by 2010. The BLS projection also anticipates shifts in the composition of Federal expenditures over the 2000–10 period. Transfer payments are projected to rise to a 51.4-percent share of Federal expenditures by 2010, continuing a historical trend that accounted for 37.1 percent of Federal expenditures in 1990 and 42.6 percent in 2000. The primary contributor underlying the growth of transfers is the combined effect of three major entitlement programs: medicare, medicaid, and Social Security. Within the next 10 years, the large baby-boom generation will begin to reach retirement age and become eligible to receive benefits from medicare and Social Security. In addition, advances in medical technology will probably keep pushing up the costs of providing health care. Underlying the demographic changes anticipated for the next decade, spending for medicare and medicaid together will account for a 28.6-percent share of Federal expenditures by 2010, up rather substantially from 12.3 percent in 1990 and 18.3 percent in 2000. Similarly, Social Security's share is projected to increase to 24.2 percent, rising from 19.9 percent and 22.0 percent in 1990 and 2000, respectively.

*Federal defense spending.* Real defense spending, which includes expenditures for military compensation and for defense capital goods and gross investment in equipment and structures,<sup>10</sup> drifted downward as a share of GDP over the past decade. Whereas real defense spending represented 10.9 percent of GDP in 1969, it totaled only 3.8 percent in 2000. (See table 1.) Defense spending levels declined absolutely over the 1988–98 period, as the military's compensation was reduced and purchases of weapons were postponed. Cuts in force levels also entailed retiring some older equipment without replacing it. In 1999, however, real spending on defense reversed its decade-long decline and started to rise slightly, due mainly to increases in consumption of capital goods and investment in equipment and software. On the basis of Defense Department estimates, the Bureau has assumed that military force levels will gradually decline through 2005 and remain fixed through the rest of the projection period.<sup>11</sup> Still, spending on weapons procurement is expected to increase throughout the period in order to refurbish and replace large blocks of equipment initially acquired during the buildup of the 1980s. In addition, defense spending on research-and-development technology programs for future weapons is expected to rise over the projection period.<sup>12</sup> As a result, real defense spending is projected to grow at an average annual rate of 1.2 percent from 2000 to 2010, reaching \$392.7 billion the latter year. (See table 7.)

*Federal nondefense spending.* Real nondefense spending, which accounts for the spending on salaries of Government

**Table 7. Government consumption expenditures and gross investment, 1980, 1990, 2000, and projected 2010**

Category	Billions of chained 1996 dollars				Average annual rate of change		
	1980	1990	2000	2010	1980-90	1990-2000	2000-10
Government consumption expenditures and gross investment .....	\$1,020.9	\$1,387.3	\$1,572.6	\$1,935.4	3.1	1.3	2.1
Federal Government consumption and investment .....	426.8	606.8	545.9	627.6	3.6	-1.1	1.4
Defense consumption and investment .....	292.7	443.2	349.0	392.7	4.2	-2.4	1.2
Consumption .....	267.7	369.7	294.5	310.6	3.3	-2.2	.5
Compensation .....	157.8	172.9	120.9	116.8	.9	-3.5	-.3
Capital consumption .....	37.5	61.2	62.6	83.5	5.0	.2	2.9
Other .....	80.2	135.0	110.8	114.0	5.4	-2.0	.3
Gross investment .....	30.8	73.2	54.7	87.2	9.0	-2.9	4.8
Nondefense consumption and investment .....	134.7	163.0	196.7	234.7	1.9	1.9	1.8
Consumption .....	120.4	140.1	154.2	158.1	1.5	1.0	.3
Compensation .....	79.5	83.2	79.5	70.2	.5	-4	-1.2
Capital consumption .....	7.0	13.3	26.4	47.2	6.6	7.1	6.0
Change in inventories .....	1.0	-2.5	2.0	.0	...	...	...
Other .....	32.8	44.8	48.7	50.8	3.2	.9	.4
Gross investment .....	15.9	23.5	42.9	82.8	4.0	6.2	6.8
State and local government consumption and investment .....	595.1	781.1	1,026.3	1,307.5	2.8	2.8	2.5
Consumption .....	494.2	638.9	821.4	982.4	2.6	2.5	1.8
Compensation .....	433.9	507.1	577.0	623.7	1.6	1.3	.8
Capital consumption .....	37.7	52.7	84.8	152.3	3.4	4.9	6.0
Other .....	41.9	81.4	161.8	231.7	6.9	7.1	3.7
Gross investment .....	100.4	142.2	205.0	331.8	3.5	3.7	4.9
Residual <sup>1</sup> .....	-35.4	-.7	-4.5	-56.6	...	...	...

<sup>1</sup> The residual is the difference between the first line and the sum of the most detailed lines.

SOURCES: Historical data, Bureau of Economic Analysis; projected data, Bureau of Labor Statistics.

employees and on administrative expenses of all Federal non-defense programs, is assumed to increase at a slower pace of 1.8 percent per year between 2000 and 2010, compared with its 1.9-percent annual rate of growth between 1990 and 2000. This assumption leads to a projected nominal growth averaging 4.5 percent per year for all nondefense spending between 2000 and 2010, below the 4.9-percent annual growth from 1990 to 2000.

*State and local governments.* Real spending by State and local governments is projected to increase 2.5 percent annually from 2000 to 2010, 0.3 percentage point below the annual growth posted for the 1990–2000 period. As a percentage of real GDP, State and local government spending declined over the past two decades, from 12.1 percent in 1980 to 11.6 percent in 1990 and 11.1 percent in 2000. This decreasing trend is expected to continue to 2010, when the share of GDP represented by State and local government spending is projected to be 10.2 percent. (See table 1.) In nominal terms, consumption expenditures are expected to continue to account for the largest component of total State and local spending in 2010, but their share of total spending is projected to decline from

82.6 percent and 78.1 percent in 1990 and 2000, respectively, to 71.4 percent in 2010. (See table 8.) In contrast, an increased level of transfer payments due to increases in medical care services and retirement pensions is expected to keep the share of transfer payments rising, from 19.3 percent in 1990 and 22.7 percent in 2000 to 28.4 percent in 2010.

Unlike the Federal Government, State and local governments cannot run budget deficits for any length of time, as their expenditures are tied closely to their available revenues. The BLS model assumes that State and local government receipts of grants-in-aid from the Federal Government for the medicaid program will grow at a rate of 8.3 percent from 2000 to 2010, well above the growth of any other revenues during the same period. Still, the 8.3-percent figure represents a sizable decline from the category's 10.7-percent annual rate of growth over the 1990–2000 period.

## Income

From 1990 to 2000, labor income accounted for a stable portion of total personal income. Wage and salary disbursements in the private sector, however, the largest segment of labor

income, increased considerably as a share of total personal income, from 56.2 percent in 1990 to 58.1 percent in 2000. (See table 2.) The BLS projections anticipate that this increasing trend in wages and salaries will continue through the projection period, reaching 59.3 percent in 2010. In contrast, business-related personal income, another major component of personal income, which has drifted downwards as a percentage of total personal income over the past 10 years, is projected to trim down to 25.1 percent in 2010, from 27.9 percent in 1990 and 26.9 percent in 2000. Labor income's net share of total personal income is expected to increase modestly, from 64.6 percent in 2000 to 65.0 percent in 2010.

Besides these traditional sources of income, personal income received from transfer payments has increased in importance over the past decades. Between 1990 and 2000, transfer payments rose as a share of personal income from 12.1 percent to 12.9 percent. The Bureau projects that the share will continue to rise until it accounts for 14.1 percent in 2010, reflecting both rising per capita medical costs and an increase in the older population, the most regular users of medicare programs.

Traditionally, personal consumption is the largest component of how people spend their incomes, and its share of income expenditures has increased over time. The BLS projections anticipate that the historical trend will continue and the share will rise to 82.7 percent of personal income in 2010, up from 78.1 percent in 1990 and 80.9 percent in 2000. As in recent years, people are expected to keep spending their incomes, resulting in a positive, but very low, personal savings level in 2010.<sup>13</sup>

On a per capita basis, nominal disposable income is projected to increase at an average annual rate of 4.8 percent from 2000 to 2010, reaching a level of \$40,768 in the latter year, a gain of more than \$15,000 over the projection span. In real terms—that is, chained 1996 dollars—per capita income is projected to grow 2.6 percent per year from 2000 to 2010, up from a 1.7-percent rate of growth between 1990 and 2000. Thus, the Bureau expects its projections to be characterized by a long-term improvement in the real standard of living, at least as measured on the basis of growth of disposable personal income.

## Employment

The unemployment rate fell for eight straight years, from 7.5 percent in 1992 to 4.0 percent in 2000, the lowest reading in 30 years. Although it is difficult to predict whether the tight labor market of the recent past will persist, the BLS model has assumed an unemployment rate of 4.0 percent in 2010, the same rate as in 2000. (See table 9.) Overall, civilian household employment is projected to increase by 1.1 percent per year from 2000 to 2010, or 1.62 million persons per year. The result is that more than 16 million employed persons will be added to the economy over the 10-year projection period. Total employment measured on a nonfarm establishment basis is expected to grow at a rate of 1.4 percent between 2000 and 2010, from 131.8 million to 152.0 million, an increase of 20.2 million jobs.<sup>14</sup>

The civilian labor force is projected to grow at a rate of 1.1 percent per year from 2000 to 2010, the same rate of increase as that attained over the preceding 10-year period. This translates

**Table 8.** State and local government receipts and expenditures, 1980, 1990, 2000, and projected 2010

Category	Billions of current dollars				Percent distribution				Average annual rate of change		
	1980	1990	2000	2010	1980	1990	2000	2010	1980-90	1990-2000	2000-10
Receipts .....	\$316.6	\$663.4	\$1,222.7	\$2,111.8	100.0	100.0	100.0	100.0	7.7	6.3	5.6
Personal taxes .....	53.9	136.1	278.7	421.0	17.0	20.5	22.8	19.9	9.7	7.4	4.2
Taxes on corporate profits .....	14.5	22.5	36.8	33.2	4.6	3.4	3.0	1.6	4.5	5.0	-1.0
Social insurance contributions ....	3.6	10.0	10.1	14.8	1.1	1.5	.8	.7	10.9	.0	3.9
Indirect business taxes .....	172.3	383.4	651.6	1,170.8	54.4	57.8	53.3	55.4	8.3	5.4	6.0
Grants-in-aid from Federal											
Government .....	72.3	111.4	245.6	472.0	22.8	16.8	20.1	22.3	4.4	8.2	6.8
Medicaid .....	14.3	43.3	119.4	265.4	4.5	6.5	9.8	12.6	11.8	10.7	8.3
Other grants .....	58.1	68.1	126.2	206.6	18.3	10.3	10.3	9.8	1.6	6.4	5.0
Expenditures .....	307.8	660.8	1,189.8	1,933.7	100.0	100.0	100.0	100.0	7.9	6.1	5.0
Consumption .....	260.4	545.8	929.0	1,381.0	84.6	82.6	78.1	71.4	7.7	5.5	4.0
Transfer payments .....	51.2	127.8	270.7	549.4	16.6	19.3	22.7	28.4	9.6	7.8	7.3
Medical care .....	24.9	78.2	204.4	456.5	8.1	11.8	17.2	23.6	12.1	10.1	8.4
Other .....	26.3	49.6	66.2	92.9	8.5	7.5	5.6	4.8	6.6	2.9	3.4
Net interest paid .....	-5.4	-6.3	-.3	18.4	-1.7	-1.0	.0	1.0	1.6	-26.9	...
Subsidies less current surplus ...	1.6	-6.3	-9.2	-14.5	.5	-1.0	-.8	-.7	...	3.9	4.6
Less dividends received .....	.1	.2	.4	.6	.0	.0	.0	.0	7.2	7.2	4.1
State and local surplus .....	8.8	2.7	32.8	178.0	...	...	...	...	-11.3	28.6	18.4

SOURCES: Historical data, Bureau of Economic Analysis; projected data, Bureau of Labor Statistics.

**Table 9. Labor supply and factors affecting productivity, 1980, 1990, 2000, and projected 2010**

Category	Levels				Average annual rate of change		
	1980	1990	2000	2010	1980-90	1990-2000	2000-10
Labor supply (in millions, unless noted):							
Total population .....	228.0	250.3	275.7	300.3	0.9	1.0	0.9
Population aged 16 and older .....	172.7	192.8	213.1	236.7	1.1	1.0	1.1
Civilian labor force .....	107.0	125.9	140.9	157.7	1.6	1.1	1.1
Civilian household employment .....	99.3	118.8	135.2	151.4	1.8	1.3	1.1
Nonfarm wage and salary employment .....	90.4	109.4	131.8	152.0	1.9	1.9	1.4
Unemployment rate (percent) .....	7.2	5.6	4.0	4.0	-2.4	-3.3	-1
Productivity:							
Nonfarm labor productivity (1992 = 100) .....	82.00	95.28	116.23	153.54	1.5	2.0	2.8

SOURCES: Historical data, Bureau of Economic Analysis, Bureau of Labor Statistics; projected data, Bureau of Labor Statistics.

into an increase of almost 17 million over the projection span.<sup>15</sup> The Bureau of the Census projects that the total U.S. population will increase at a 0.9-percent rate of growth annually over the 2000–10 period, 0.1 percentage point lower than the rate of growth between 1990 and 2000. The Census Bureau also estimates that the population aged 16 and older will increase at a rate of 1.1 percent over the projection span, 0.1 percentage point higher than the rate of growth in the earlier period.

## Productivity

Productivity, measured as output per hour in the private non-farm business sector, has demonstrated very strong gains since 1995. After almost two decades of growing about 1.5 percent per year, productivity soared to a 2.5-percent annual growth rate from 1995 through 2000. That rise has been a crucial factor in helping the United States enjoy an optimal combination of rapid expansion, low unemployment, dormant inflation, rising profits, and respectable wage gains. Historically, in periods of strong economic growth, gains in productivity accelerated as business orders increased, allowing workers and machines to be used at full efficiency. However, the surge in U.S. productivity growth after 1995 is not simply the result of strong overall economic growth. Rather, it occurred at a time when the economy already was enjoying a high rate of utilization of resources. In fact, economic data suggest that almost none of the acceleration in productivity after 1995 is due to adjustments for responses to the business cycle. One reason—though perhaps not the only one—explaining that phenomenon is that the accumulating advances in new technology and its applications have engendered a pronounced rise in rates of return on high-tech investment, which has led to a stepped-up pace of capital spending and increased productivity growth.

Over the next 10 years, it is uncertain whether the structural acceleration in productivity that emerged in 1995–2000 will continue, but some shift to a higher level of productivity is fore-

seen. The Bureau anticipates continued high productivity growth at a sustainable rate of 2.8 percent per year over the 2000–10 period, compared with 2.0 percent between 1990 and 2000. This expected solid productivity growth in the aggregate economic projections is consistent with the continued strong growth of capital stocks resulting from the projected rates of business investment, especially in efficiency-enhancing equipment and computer software.<sup>16</sup>

## Major assumptions

The aggregate economic projections presented in this article have been developed in the context of the macroeconomic model provided by DRI · WEF, Inc., of Lexington, Massachusetts. The company's Comprehensive Quarterly Model of the U.S. Economy comprises over 2,100 variables descriptive of the economy, of which 234 are exogenous assumptions—that is, variables whose values must be provided to the model in order for it to calculate a solution for a given period of time. One of the purposes of the sensitivity analysis discussed in the next section is to identify that subset of the 234 exogenous assumptions which comprises the most important ones in the determination of GDP, its demand makeup, and the level of employment necessary to produce the value of GDP that has been identified. These more critical exogenous assumptions are presented in table 10 for variables falling into three major categories: energy-related variables, tax-related variables, and fiscal-policy-related variables. A fourth category of assumptions affecting the results, demographics, is discussed shortly, but is not presented in table 10, because these assumptions have already appeared in table 9.

Among the energy-related assumptions, the most important is the refiners' acquisition price for crude oil, expressed in dollars per barrel. In the aggregate economic model, the level of GDP determines the level of energy demanded by the economy; the price of crude oil determines the level of domestic production, and the residual amount of the energy demand

**Table 10.** Major assumptions affecting aggregate projections, 1980, 1990, 2000, and projected 2010

Exogenous variables	Billions of chained 1996 dollars (unless otherwise noted)				Average annual rate of change		
	1980	1990	2000	2010	1980-90	1990-2000	2000-10
<b>Energy related:</b>							
Refiners' crude oil acquisition cost (dollars per barrel) .....	\$33.97	\$22.20	\$27.68	\$26.63	-4.2	2.2	-0.4
Electric utility fuel use—coal share ( as percentage of total fuel use) .....	50.8	52.9	51.7	49.3	.4	-.2	-.5
Fuel efficiency, all autos (miles per gallon) .....	12.4	17.6	19.9	21.3	3.6	1.3	.7
<b>Tax related:</b>							
Effective Federal personal tax rate .....	23.2	21.0	22.9	20.9	-1.0	.9	-.9
Effective Federal corporate tax rate .....	40.1	33.7	31.7	29.8	-1.7	-.6	-.6
Effective Federal social insurance tax rate .....	11.8	14.5	14.3	13.4	2.1	-.2	-.7
Federal gasoline tax (cents per gallon) .....	4.0	10.6	19.5	19.5	10.3	6.3	.0
<b>Fiscal policy related:</b>							
Defense compensation .....	157.8	172.9	120.9	116.8	.9	-3.5	-.3
Other defense consumption expenditures .....	80.2	135.0	110.8	114.0	5.4	-2.0	.3
Defense gross investment expenditures .....	30.8	73.2	54.7	87.2	9.0	-2.9	4.8
Nondefense compensation .....	79.5	83.2	79.5	70.2	.5	-.4	-1.2
Other nondefense consumption expenditures .....	32.8	44.8	48.7	50.8	3.2	.9	.4
Nondefense gross investment expenditures .....	15.9	23.5	42.9	82.8	4.0	6.2	6.8
Federal housing subsidies (current dollars) .....	5.5	15.5	19.8	26.4	10.9	2.5	2.9
Federal transfer payments, medicare .....	95.6	141.9	195.8	329.8	4.0	3.3	5.4
Federal grants-in-aid, medicaid .....	38.3	56.9	108.3	169.1	4.0	6.6	4.6
Federal grants-in-aid, other than medicaid .....	106.5	79.1	112.6	150.8	-2.9	3.6	3.0

SOURCES: Historical data, Bureau of Economic Analysis, U.S. Geological Survey, Energy Information Administration, Federal Highway Administration; projected data, Bureau of Labor Statistics.

not met by domestic production is, by assumption, met by imports of crude petroleum. This particular assumption is drawn from annual energy projections prepared by the U.S. Department of Energy,<sup>17</sup> which expects the dollar value of a barrel of crude oil to stabilize gradually after a recent spike; a moderately downward trend in oil prices is anticipated over the coming decade. Also important to the determination of domestic fuel consumption is the fuel efficiency of the Nation's automotive fleet,<sup>18</sup> which is expected to rise gradually to an average of 21.3 miles per gallon by 2010, an increase of 0.7 percent each year over the coming decade.

Tax-related assumptions affect Federal Government revenues. Effective Federal personal tax rates increased significantly from 21.0 percent of personal income in 1990 to 22.9 percent by 2000. Reflecting the recently passed 10-year tax cuts, a gradual decrease in this rate is expected to occur over the next decade. In the BLS projections, it is assumed that the effective personal tax rate will drop to 20.9 percent in 2010, noticeably lower than that in 2000. The effective corporate profits tax rate, defined as corporate profits tax revenues divided by corporate pretax profits, is assumed to continue its decades-long downward trend throughout the projection period, from 33.7 percent in 1990 to 31.7 percent in 2000 to an anticipated 29.8 percent by 2010. Federal social insurance tax rates are based on mandated rates, which are slated to decline

to 13.4 percent by 2010. Finally, the Federal gasoline tax, expressed in cents per gallon, grew sharply from its 4-cent level in 1980 to 19.5 cents per gallon in 2000. The model assumes that after 2000 there will be virtually no increase in gasoline taxes, at least at the Federal level.

Turning to fiscal-policy-related assumptions, it should be noted that defense compensation is expected to fall in real terms from 2000 through 2010, while the size of the Armed Forces is assumed to decline through 2005 and remain fixed by 2010. More than offsetting this decline in defense compensation are assumed real increases in other defense consumption spending and in defense gross investment, as it becomes necessary to replace or improve the equipment available to the Armed Forces. On the nondefense side, real spending on compensation is expected to decrease mildly over the 2000-10 period as well, but the other nondefense categories—expenditures for other consumption and for gross investment—are assumed to increase over the same projection horizon.

As regards other fiscal-policy-related assumptions, Federal grants-in-aid to State and local governments are projected to slow their growth relative to the last 10 years, while the Federal housing subsidies program is assumed to show a moderate growth over the projection period. The sharp contrast of a rapid growth is expected in the Federal Government's medicare program, reflecting an increase in numbers in the older popu-

lation.

Demographic variables detailing the U.S. population are drawn from Census Bureau projections and have been described elsewhere in this article. Monetary policy levers allow for ample money supply growth to fuel the expansion of the economy without getting in the way of that expansion. Finally, the projections are based on an assumption that there will be no major wars, oil embargoes, significant price shocks, or serious natural catastrophes of a magnitude that would affect the long-term growth potential of the economy during the projection period. In sum, the projections anticipate a growth economy, including a steady expansion of the labor force, strong productivity growth, a favorable outlook regarding inflation, and good opportunities for jobs.

### Sensitivity of projections

While the use of a macroeconomic model to prepare projections may appear to be a precise and scientific operation, the

development of an economic projection is actually filled with uncertainty. The BLS assumptions cover a broad range, including certain components of Federal expenditures, tax rates, transfer payments, population levels, oil prices, and other variables that influence the outcome of the projections. Divergent viewpoints about these assumptions would naturally lead to different economic projection paths. A sensitivity study examining the impact of changes in such “single-variable” assumptions can assist users in identifying results that are most likely to be affected by unexpected developments in key assumptions.

In general, two types of assumptions are required in the macroeconomic model in order to develop a set of aggregate economic projections. First, the values of the exogenous variables are assigned outside of the model and remain fixed throughout the projection. Second, the values of those behavioral endogenous variables which are determined by the model’s equations, but which are used as critical measures of projection, must be evaluated carefully for their impacts on

**Table 11.** Percent change in projected values for 2010 resulting from a 10-percent increase in selected exogenous variables<sup>1</sup>

Exogenous variables	GDP, chained 1996 dollars	Disposable income, chained 1996 dollars	Household employment	Unemployment rate	Housing starts	Yield on 10-year U.S. Treasury notes	Exchange rate (index)
Energy related (changed 10 percent):							
Domestic share of U.S. crude oil acquisitions .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electric utility fuel use, coal share .....	.0	.0	.0	.1	.0	.1	.0
Fuel efficiency, all autos .....	-.1	.0	.0	-.3	.0	.7	.1
Tax related (changed 10 percent):							
Effective Federal corporate tax rate .....	.0	-.2	.0	-.5	.3	-1.4	-.4
Effective State and local corporate tax rates .....	.0	.0	.0	-.1	.0	-.1	.0
Effective Federal social insurance tax rate .....	.1	-1.2	.0	-.3	1.5	-6.7	-1.6
Effective State and local social insurance tax rate .....	.0	.0	.0	.0	.0	.0	.0
Employer share of Federal Social Security contributions .....	-.2	.1	-.1	1.2	-.2	2.3	.4
Employer share of State and local Social Security contributions .....	.0	.0	.0	.0	.0	.0	.0
Federal gasoline tax .....	.0	.0	.0	-.3	.1	-.2	.0
State and local gasoline tax .....	.0	.0	.1	-1.1	.3	-.8	.0
Federal expenditures (changed 10 percent):							
Defense compensation .....	-.2	.1	-.1	1.1	-.8	2.9	.6
Other defense consumption expenditures .....	-.1	.0	.0	.5	-.4	1.6	.3
Defense gross investment expenditures .....	.0	.0	.0	.2	-.2	1.1	.3
Nondefense compensation .....	-.1	-.1	.0	.7	-.5	1.7	.4
Other nondefense consumption expenditures .....	.0	.0	.0	.2	-.1	.6	.1
Nondefense gross investment expenditures .....	.0	.0	.0	.1	-.2	.9	.2
Federal housing subsidies .....	.0	.0	.0	.1	.0	.2	.1
Grants and transfer payments (changed 10 percent):							
Federal transfer payments, medicare .....	-.1	.6	.0	.9	-.9	4.9	1.1
Federal grants-in-aid, medicaid .....	-.3	.4	-.1	2.2	-1.7	7.5	1.5
Federal grants-in-aid, other than medicaid .....	-.1	.1	.0	.5	-.5	2.2	.5
Other (changed 1 percent):							
Population aged 16 and older .....	1.2	.8	1.4	-4.1	2.4	-5.6	-.9
Population aged 65 and older .....	-.2	-.1	-.2	.9	-.6	1.8	.3
Nonborrowed reserves at Federal Reserve banks .....	.0	-.2	-.1	2.1	-.5	-.5	-.8

See notes at end of table.

**Table 11.** Continued—Percent change in projected values for 2010 resulting from a 10-percent increase in selected exogenous variables<sup>1</sup>

Exogenous variables	Personal consumption expenditures, chained 1996 dollars			Gross private domestic investment, chained 1996 dollars			Foreign trade, chained 1996 dollars		Government, chained 1996 dollars	
	Durables	Non-durables	Services	Nonresidential		Residential	Exports	Imports	Federal	State and local
				Equipment and software	Structures					
Energy related (changed 10 percent):										
Domestic share of U.S. crude oil acquisitions .....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electric utility fuel use, coal share .....	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Fuel efficiency, all autos .....	-1	-7	-1	.0	.0	-1	.0	-4	.0	.0
Tax related (changed 10 percent):										
Effective Federal corporate tax rate .....	.0	-1	-1	-2	.2	.2	.2	-2	.0	.0
Effective State and local corporate tax rates .....	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Effective Federal social insurance tax rate .....	-6	.0	-2	.5	.6	.8	.8	-5	.0	.0
Effective State and local social insurance tax rate .....	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Employer share of Federal Social Security contributions .....	-1	.0	-1	-2	-5	-4	-2	.2	.0	-1
Employer share of State and local Social Security contributions .....	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Federal gasoline tax .....	.0	.0	.0	.0	.1	.1	.0	.0	.0	.0
State and local gasoline tax .....	.2	.0	.0	-1	.3	.3	.0	-1	.0	.0
Federal expenditures (changed 10 percent):										
Defense compensation .....	-3	.0	-3	-3	-7	-8	-3	.1	2.0	-1
Other defense consumption expenditures .....	-2	.0	-1	-1	-3	-4	-1	.2	1.8	.0
Defense gross investment expenditures .....	-1	.0	-1	-1	-2	-2	.0	.1	2.0	.0
Nondefense compensation .....	-2	-1	-1	-2	-4	-5	-2	.0	1.2	-1
Other nondefense consumption expenditures .....	-1	.0	.0	.0	-1	-1	.0	.1	.8	.0
Nondefense gross investment expenditures .....	-1	.0	-1	-1	-2	-2	-1	.1	.7	.0
Federal housing subsidies .....	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Grants and transfer payments (changed 10 percent):										
Federal transfer payments, medicare .....	-3	.2	.3	-3	-7	-8	-5	.4	.0	.0
Federal grants-in-aid, medicaid ...	-1.0	.2	.2	-5	-1.4	-1.6	-6	.5	.0	.2
Federal grants-in-aid, other than medicaid .....	-2	.0	-1	-2	-5	-5	-2	.1	.0	1.1
Other (changed 1 percent):										
Population aged 16 and older .....	2.0	1.1	1.1	.9	2.2	2.5	.2	.2	.0	.9
Population aged 65 and older .....	-3	-1	-1	-2	-5	-6	-1	.0	.0	-1
Nonborrowed reserves at Federal Reserve banks .....	-3	-2	-2	.2	-4	-3	.7	.0	.0	.0

<sup>1</sup> One percent where noted.

projected data, Bureau of Labor Statistics.

SOURCES: Historical data, Bureau of Economic Analysis, U.S. Geological Survey, Energy Information Administration, Federal Highway Administration;

key endogenous results. By their very nature, the exogenous variables are the most amenable variables to sensitivity testing, so they receive the majority of attention. The endogenous variables are generally less visible and far more diffi-

cult to assess for sensitivity purposes, because they are more a function of the work that goes into preparing for the projections. For that reason, the sensitivity analysis in this section focuses on the assumptions behind the exogenous variables.



As stated earlier, the macroeconomic model used in the BLS aggregate economic projections includes 234 exogenous variables. The sensitivity analysis examines mainly those key assumptions listed in the first column of table 11. In each case, the single exogenous variable in question is increased by 10 percent from the baseline projection for the 2000–10 period, and a new solution to the model is generated. Obviously, in certain cases, such as the population aged 16 years and older, a 10-percent change is not realistic, so a 1-percent change is applied.

Through the percent increases in the exogenous variables, the table shows the results of the percent changes in the projected values of selected target variables, such as real GDP and its major components, real disposable income, the unemployment rate, and interest rates. The analysis reveals that the macroeconomic model appears to be least affected by changes in the energy sectors. For example, a 10-percent increase in the domestic share of U.S. crude-oil acquisitions has no influence upon real GDP and other selected target variables. Turning to tax-related exogenous variables reveals that, in general, increases in taxes would reduce real GDP through lowered demand. The lone exception is that a 10-percent increase in the effective Federal social insurance tax rate sharply lowers interest rates by 6.7 percent and reduces the exchange rate by 1.6 percent. Enough investment spending and strong exports therefore overcome the reduction in personal consumption expenditures for durable goods.

A higher level of Federal defense compensation results in slightly lower real GDP. The reason is that, through its effects

on the Federal budget, the increase in defense compensation has the effect of increasing interest rates. The increased interest rates, in turn, reduce real GDP, especially in the areas of residential structures and nonresidential structures. In a similar fashion, although increases in Federal transfer payments for Medicare or Federal grants-in-aid for Medicaid would lead to higher disposable income, they would have a counteracting effect on interest rates. The net result, though, is that the effect on interest rates would prove stronger, reducing personal consumption on durable goods, as well as business investment in both nonresidential and residential structures.

Exogenous variables related to population illustrate a strong impact on real GDP and income. In the model, a 1.0-percent increase in the segment of the population aged 16 and older results in a 1.2-percent increase in real GDP on the demand side, in addition to a 0.8-percent increase in real disposable income on the supply side, due to increases in the size of the labor force. Also, a 1.0-percent increase in the same 16-and-older group implies a larger home-buying population, resulting in a 2.4-percent increase in housing starts, accompanied by a 2.5-percent rise in demand for residential structures.

In sum, the key results of the macroeconomic model are more heavily influenced by some exogenous assumptions than by others. Increases in either exogenous Federal expenditures or transfer payments have a relatively minor effect on real GDP, although increases in transfer payments would lead to higher disposable personal income. An increase in the population older than 16 would significantly boost employment.<sup>19</sup> □

## Notes

<sup>1</sup> Real GDP and its components are stated in 1996 chain-weighted dollars. Chain weighting replaces the past practice of computing those indicators by reference to fixed base-year prices with an averaging technique. The chain-weighted methodology calculates the prices of goods and services in order to use weights that are appropriate for the specific periods or years being measured. As a result, for a particular year, the most detailed GDP components do not add up to their chain-weighted aggregates, and the chain-weighted aggregates do not add up to the chain-weighted real GDP. For more details, see “Preview of the Comprehensive Revision of the National Income and Product Accounts: BEA’s New Featured Measures of Output and Prices,” *Survey of Current Business*, July 1995, pp. 31–38; and J. Steven Landefeld and Robert P. Parker, “BEA’s Chain Indexes, Time Series, and Measures of Long-Term Economic Growth,” *Survey of Current Business*, May 1997, pp. 58–68. In the current article, discussions of GDP and its final demand components are couched in terms of real values, unless otherwise noted. Finally, all historical National Income and Product Account data presented in this article are consistent with data published through the August 2001 issue of the *Survey of Current Business*.

<sup>2</sup> The BLS aggregate economic projections are developed in the context of the macroeconomic model provided by the DRI-WEFA forecasting group, formerly Data Resources, Inc. (DRI). The assumptions are based on long-term trend growth assumptions, and no attempts are made to forecast business cycle fluctuations.

<sup>3</sup> The savings rate is defined as the percentage of personal after-tax

income that is not spent on consumption, paid out as interest, or given away to foreigners. The savings rate does not, however, take into account gains from rising stocks and real-estate values.

<sup>4</sup> U.S. population assumptions are based on the Bureau of the Census middle-series resident population projections from 1999 to 2100, adjusted for overseas Armed Forces personnel. (See Frederick W. Hollmann, Tammany J. Mulder, and Jeffrey E. Kallan, “Methodology and Assumptions for the Population Projections of the United States: 1999 to 2100,” working paper no. 38 (U.S. Bureau of the Census, Population Division, January 2000).)

<sup>5</sup> See “Projections of the Number of Households and Families in the United States: 1995 to 2010,” *Current Population Reports*, Series P25–1129 (U.S. Department of Commerce, Bureau of the Census, April 1996). The Census Bureau will release a new set of U.S. household projections consistent with the new U.S. population projections.

<sup>6</sup> Each year, the Energy Information Administration of the Department of Energy publishes a range of estimates regarding energy supply and demand over the coming 20 years. The Bureau’s energy assumptions for nominal world oil prices are based on the Department of Energy results. (See *Annual Outlook 2001 with Projections to 2020* (U.S. Department of Energy, Energy Information Administration, December 2000).) The real imported oil prices are derived from their nominal prices, deflated by the GDP chain-weighted deflators.

<sup>7</sup> Housing services include an imputed rental value of owner-occu-

pied dwellings, rent from tenant-occupied dwellings, and the rental value of farm dwellings and other housing, such as hotels and motels.

<sup>8</sup> The recent energy crisis in California due to shortages of electricity and a record surge in residential natural-gas prices caused by escalating demand during a colder-than-usual winter is considered to be a short-term development. Actually, natural-gas prices are already falling from January 2000's record high levels. In the long term, energy prices are assumed to be settling down.

<sup>9</sup> In December 1999, the National Income and Product Accounts recognized business expenditures for computer software as investment. Previously, only software embedded in equipment by the producer of that equipment was counted as investment. Business purchases for software for own-account production (that is, software produced by a business for its own use) were classified as inputs to production. For further reading and information, see "A Preview of the 1999 Comprehensive Revision of the National Income and Product Accounts: Definitional and Classificational Changes," *Survey of Current Business*, August 1999, pp. 7–20; and "Improved Estimates of the National Income and Product Accounts for 1959–98, Results of the Comprehensive Revision," *Survey of Current Business*, December 1999, pp. 19–37.

<sup>10</sup> In January 1996, the National Income and Product Accounts recognized government expenditures on equipment and structures as investment. Accordingly, government purchases are now divided into consumption expenditures and gross investment. This approach treats government purchases of fixed assets in a manner more symmetric to the treatment of such assets in the private sector. For further details, see "Preview of the Comprehensive Revision of the National Income and Product Accounts: Recognition of Government Investment and Incorporation of a New Methodology for Calculating Depreciation," *Survey of Current Business*, September 1995, pp. 33–41. In December 1999, the National Income and Product Accounts reclassified government purchases of own-account production of software (that is, software produced by a government agency for its own use) from government consumption expenditures to gross government investment. This shift has no effect on GDP. (See footnote 9 for further readings.)

<sup>11</sup> Defense Department spending and force-level estimates through the year 2005 are published in *National Defense Budget Estimates For FY2001* (Office of the Under Secretary of Defense (Comptrol-

ler), March 2000).

<sup>12</sup> For a detailed discussion of defense spending, see "Chapter Four: Options for National Defense," *Budget Options* (The Congress of the United States, Congressional Budget Office, February 2001), pp. 93–188.

<sup>13</sup> See note 3 for a discussion of personal savings and the savings rate.

<sup>14</sup> Employment on a household basis, the concept of employment used in the aggregate economic projections discussed in this article, is a count of persons who are working or actively seeking work. The historical estimates for household employment are derived from the Current Population Survey, a survey carried out for the Bureau of Labor Statistics by the U.S. Bureau of the Census. The concept of employment on an industry level of detail, discussed elsewhere in this issue of the *Review*, is a count of jobs and is based on an establishment-level survey called the Current Employment Survey. Since 1994, these two measures have diverged sharply. For an explanation of the recent increase in this employment gap, see Chinhui Juhn and Simon Potter, "Explaining the Recent Divergence in Payroll and Household Employment Growth," *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, vol. 5, no. 16, December 1999, pp. 1–6.

<sup>15</sup> For a further discussion of the labor force, see Howard N Fullerton, Jr., and Mitra Toossi, "Labor force projections to 2010: steady growth and changing composition," this issue, pp. 21–38.

<sup>16</sup> For a further, detailed discussion of labor productivity and employment, see Jay M. Berman, "Industry output and employment projections to 2010," this issue, pp. 39–56.

<sup>17</sup> See note 6 for a discussion of the Bureau's energy assumptions.

<sup>18</sup> This measurement of the fuel efficiency of the automotive fleet includes automobiles, sport utility vehicles, and other small trucks purchased for personal use.

<sup>19</sup> For a more complete discussion of the sensitivity of the aggregate economic projections, see Norman C. Saunders, "Sensitivity of BLS economic projections to exogenous variables," *Monthly Labor Review*, December 1986, pp. 23–29. A like analysis appears in Thomas Boustead, "The U.S. economy to 2006," *Monthly Labor Review*, November 1997, pp. 6–22.