

THE ANNUAL REPORT
OF THE
COUNCIL OF ECONOMIC ADVISERS

LETTER OF TRANSMITTAL

COUNCIL OF ECONOMIC ADVISERS,
Washington, D.C., February 13, 2006

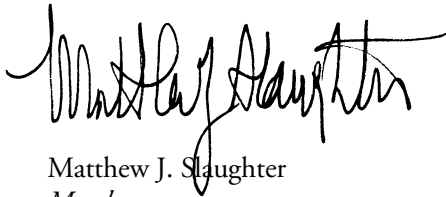
MR. PRESIDENT:

The Council of Economic Advisers herewith submits its 2006 Annual Report in accordance with the provisions of the Employment Act of 1946 as amended by the Full Employment and Balanced Growth Act of 1978.

Sincerely,

A handwritten signature in black ink, appearing to read 'K Baicker', with a long horizontal flourish extending to the right.

Katherine Baicker
Member

A handwritten signature in black ink, appearing to read 'Matthew J. Slaughter', with a long horizontal flourish extending to the right.

Matthew J. Slaughter
Member

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Overview

The expansion of the U.S. economy continued for the fourth consecutive year in 2005. The President has laid out an agenda to maintain the economy's momentum, foster job creation, and ensure that America remains a leader of the global economy.

The President is advancing plans to make tax relief permanent; restrain government spending to reduce the budget deficit; strengthen retirement systems; make health care more affordable and accessible; create an economic environment that encourages innovation and entrepreneurship; enhance private incentives for research and development; boost math and science education and worker training; reform the immigration system and strengthen our borders; continue to open markets to American goods and services; and reduce America's dependence on foreign oil by diversifying our energy supply.

This *Report* reviews the state of the economy and the economic outlook, and discusses a number of economic policy issues of continuing importance. The *Report* highlights how economics can inform the design of better public policy and reviews Administration initiatives.

The Year in Review and the Years Ahead

The economy has shifted from recovery to sustained expansion, having absorbed the effects of the Gulf Coast hurricanes and large increases in energy prices in 2005. Chapter 1, *The Year in Review and the Years Ahead*, reviews the economic developments of 2005 and discusses the Administration's forecast for the years ahead. The key points of this chapter are:

- Real GDP grew strongly during 2005. Most components of demand that accounted for growth in 2004—consumer spending, business investment in equipment and software, and exports—continued to do so in 2005.
- Labor markets continued to strengthen. Employers created 2 million new jobs in 2005, and the unemployment rate dropped to 4.9 percent by year-end.
- Productivity growth remained well above its historical average in 2005.
- Inflation rose substantially at mid-year, but came down by year-end as it reflected the movement of energy prices. In contrast, inflation in the core consumer price index (CPI) (which excludes food and energy prices) has remained in the moderate 2-percent range.
- The Administration's forecast, consistent with consensus private forecasts, shows the economic expansion continuing for the foreseeable future.

Skills for the U.S. Workforce

Chapter 2, *Skills for the U.S. Workforce*, discusses the economics of education, immigration, and job training. The key points are:

- Education is a key contributor to economic growth and individual income.
- Advances in education levels have slowed over the past 25 years. The No Child Left Behind Act is working to reverse this trend by making schools more accountable. If, however, we do not continue to improve our schools, the U.S. standard of living could be jeopardized in years to come.
- High-skilled immigrants make up a vital part of the U.S. economy, particularly in the science and engineering sectors.
- Workers need to upgrade their skills continually to adapt to and take part in an ever-changing economy.

Promoting a flexible and skilled labor force—through improved access to high-quality primary, secondary, and post-secondary education, through policies that attract the world’s best and brightest to our shores, and through investment in the continuing education and training of our mobile workforce – will ensure that the United States remains a competitive leader in this rapidly changing world economy.

Saving for Retirement

Over the past few decades, concerns have mounted that Americans have been preparing inadequately for retirement. The main points of Chapter 3, *Saving for Retirement*, are:

- Most working-age Americans are on track to have more retirement wealth than most current retirees. It is inherently difficult, however, to assess whether these preparations are adequate for most households.
- The decline in an often-cited aggregate personal saving rate may not be cause for much alarm for retirement preparedness. Much of this decline can be attributed to spending triggered by wealth increases from capital gains on housing and financial assets.
- There are, however, a number of risks to the retirement preparations of Americans. People today are living longer and could face higher health-care costs in retirement than members of previous generations. In addition, Social Security and many defined-benefit pension plans are at risk.
- Both defined-benefit pensions and Social Security suffer from fundamental financial problems that expose not just retirees but all U.S. taxpayers to risk of substantial losses. The Administration is focused on addressing these problems and protecting the Nation’s retirement security.

Improving Incentives in Health Care Spending

Health care spending in the United States has increased rapidly over the past several decades, rising 44 percent in real per capita terms in the past ten years alone. Some of the reasons for this marked rise reflect higher-quality health care, such as improved technological options for enhancing health and quality of life. Other factors, however, such as poorly functioning markets for health care, may have led to excessive spending and inefficient patterns of medical care utilization.

Chapter 4, *Improving Incentives in Health Care Spending*, reviews the causes and consequences of health care spending growth and discusses how the President's consumer-driven proposals can improve the health care system. The key points are:

- Growth in spending on health care has been much more rapid than general inflation, straining consumers, employers, and government budgets.
- Perverse tax and insurance incentives have led to inefficient levels and composition of spending on health care.
- Promoting a stronger role for consumers is a promising strategy for improving health care value and affordability.

The U.S. Tax System in International Perspective

All governments face two important decisions. They must choose the scope and scale of public goods and services to provide for their citizens, and they must also decide how to collect the funds to finance those public services. Chapter 5, *The U.S. Tax System in International Perspective*, examines U.S. choices in the context of other countries. It makes three key points:

- Fundamental choices about tax systems matter because they affect the living standards of citizens.
- The United States has made different choices from other countries. The United States has a relatively low tax burden compared to the rest of the world, and we finance more of that burden with a tax on personal income instead of consumption.
- When viewed in an international perspective, the U.S. system has been significantly improved in recent years but could benefit greatly from additional reforms, particularly those focused on the taxation of capital income.

The U.S. Capital Account Surplus

The United States conducts an enormous number of trade and financial transactions with other countries. In 2004, the U.S. ran a current account deficit of \$668 billion. This deficit meant the U.S. imported more goods and services than it exported. The counterpart to the U.S. current account deficit was a capital account surplus of an equal amount. This surplus meant that foreign investors purchased more U.S. assets than U.S. investors purchased in foreign assets, and the U.S. received net foreign capital and financial inflows. Chapter 6, *The U.S. Capital Account Surplus*, makes several key points:

- The size and persistence of U.S. net capital inflows reflects a number of U.S. economic strengths as well as some shortcomings.
- The recent rise in U.S. net capital inflows in part reflects global economic conditions as well as policies in some Asian countries and weak growth in several European economies that led to greater net capital outflows from these countries.
- Encouraging greater global balance of capital flows would be helped by steps in several countries, such as higher domestic saving in the U.S., stronger economic growth in Europe and Japan, and greater exchange rate flexibility and financial sector reforms in Asia.

The History and Future of International Trade

While economic research and historical evidence show the benefits of trade outweigh the costs, trade liberalization has always brought anxieties in the United States and throughout the world. There have always been temptations to retreat to economic isolationism, but the Administration rejects that notion. The key points in Chapter 7, *The History and Future of International Trade*, are:

- Over the past 70 years, policymakers across political parties have consistently recognized the importance of international commerce, and have achieved major trade liberalization both here and abroad.
- The net payoff to America from these achievements has been substantial. For example, studies have estimated the annual payoff from U.S. trade and investment liberalization thus far averages \$5,000 per American.
- A number of barriers to trade remain, especially in services, and the benefits of eliminating these barriers are significant. One study found removing all remaining barriers to trade in services would lead to an additional \$7,000 in annual income for the average American family of four. The Administration is working to open these markets in global, regional, and bilateral negotiations.

The U.S. Agriculture Sector

In 2005, the Federal government spent approximately \$20 billion on agricultural support payments in a sector forecast to produce approximately \$270 billion of output. In addition, the United States maintains barriers to the import of some commodities, and these barriers raise the domestic prices of these commodities relative to world prices. To what extent do these many payments and trade barriers serve a public purpose? Are they needed to maintain a healthy U.S. agricultural sector? Could alternative policies achieve this goal? Chapter 8, *The U.S. Agricultural Sector*, addresses these and other questions. The key findings of this chapter are:

- Most farmers do not benefit from commodity subsidies.
- Support to agriculture can be provided in many forms that are potentially less market-distorting than existing commodity subsidies.

The U.S. Financial Services Sector

Most people interact regularly with the financial services sector, such as when they make deposits at banks or obtain loans from them. Nevertheless, understanding what this sector does can be difficult. Why do individuals go to intermediaries like banks for mortgages, rather than skip intermediaries and deal directly with savers? And why do financial service firms ask for so much information before making a loan and, afterward, place so many restrictions on borrowers?

Chapter 9, *The U.S. Financial Services Sector*, explores what financial services do for an economy, how financial development relates to economic performance, and how financial services can be effectively regulated. The key points are:

- The U.S. financial services sector addresses informational problems that can otherwise keep financial capital from finding productive uses. The sector tends to deliver these services in a cost-effective manner.
- Financial services facilitate innovation and thus encourage economic growth. They might also bolster economic stability.
- Financial regulation should protect consumers and ensure the system's safety and soundness. Moving too far in the direction of public regulation, however, can stifle the productivity and innovation necessary for the economy to enjoy fully the benefits of financial services. An effective financial regulatory system appropriately balances the costs and benefits of public regulation.

The Role of Intellectual Property in the Economy

The founders of this country believed that intellectual property was so important that one of the grants of power to Congress under the Constitution was “To promote the Progress of Science and the useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.” Economic research over the past two centuries confirms the importance of intellectual property. The key points of Chapter 10, *The Role of Intellectual Property in the Economy*, are:

- Intellectual property rights create incentives for individuals and firms to invest in research and development, and to commercialize inventions by allowing them to profit from their creations.
- Well-defined and enforced intellectual property rights are important to economic growth.
- The Administration continues to enforce vigorously the rights of American intellectual property owners.

Recent Developments in Energy

Chapter 11, *Recent Developments in Energy*, discusses energy markets—systems that connect consumers and suppliers of energy products, where prices are determined by what buyers will pay and what sellers will accept. The chapter reviews developments in markets for crude oil, refined petroleum products, and natural gas, as well as developments in the electricity-generation sector. The key points are:

- Increased scarcity and rising prices over time will encourage conservation, increase incentives for exploration, and stimulate the development of new, energy-efficient technologies and alternative energy sources.
- In the near term, unexpected disruptions to energy supply and distribution networks may continue to affect consumers and businesses. Hurricanes Katrina and Rita demonstrated that competitive markets play a central role in allocating scarce energy resources, especially during times of natural disaster or national emergency.
- The continued expansion of energy markets through regional and global trade can further increase our resilience to energy supply disruptions.
- Policies that reduce U.S. vulnerability to energy disruptions, encourage energy efficiency, and protect the environment can be beneficial supplements to markets. These policies can be made more effective and less costly when designed based on economic incentives.

The Year in Review and the Years Ahead

The expansion of the U.S. economy—having gathered momentum in 2003 and 2004—continued for its fourth full year in 2005. Economic growth was solid, with real gross domestic product (GDP) growing 3.1 percent during the four quarters of 2005 and 3.5 percent for the year as a whole. Near-record prices of energy and damage from several powerful hurricanes threatened to derail the expansion, but growth was well maintained in the face of these shocks and a long series of rate hikes by the Federal Reserve. Productivity growth remained well above its historical average.

This chapter reviews the economic developments of 2005 and discusses the Administration's forecast for the years ahead. The key points of this chapter are:

- Real GDP grew strongly during 2005. Most components of demand that accounted for growth in 2004 continued to do so in 2005: consumer spending, business investment in equipment and software, and exports.
- Labor markets continued to strengthen. The unemployment rate continued to decline, and employers created another 2 million jobs.
- Inflation rose substantially at mid-year, but came down by year-end reflecting the movement of energy prices. In contrast, inflation in the core consumer price index (CPI) (which excludes food and energy prices) has remained in the moderate 2-percent range, and inflation expectations for the period beyond a one-year horizon remain moderate and stable.
- The Administration's forecast calls for the economic expansion to continue in 2006, with real GDP growth close to its post-World War II average rate and the unemployment rate stable at about its current level. This is expected to continue in subsequent years.

Developments in 2005 and the Near-Term Outlook

Despite the impacts of rising energy prices and a devastating hurricane season (see Box 1-1), the U.S. economy continued to expand at a solid pace in 2005 and inflation pressures remained contained.

Consumer Spending and Saving

Consumer spending continued its strong growth in 2005, rising faster than disposable income over the past decade and a half. As a result, the personal

Box 1-1: Economic Impact of the 2005 Hurricanes

In addition to the tragic loss of life and the massive destruction of personal property, the two major hurricanes (Katrina on August 29 and Rita on September 24) damaged the productive capacity of the American economy. Hurricane Wilma (October 24) also caused sizable losses to life and property, but the damage to the economy as a whole was much less. Both Hurricane Katrina and Hurricane Rita passed through offshore areas where oil and natural gas platforms are concentrated and then struck on-shore areas where petroleum is refined and natural gas is processed. In addition to the damage to equipment and structures, the hurricanes separated at least 782,000 workers from their jobs (and displaced many more from their homes).

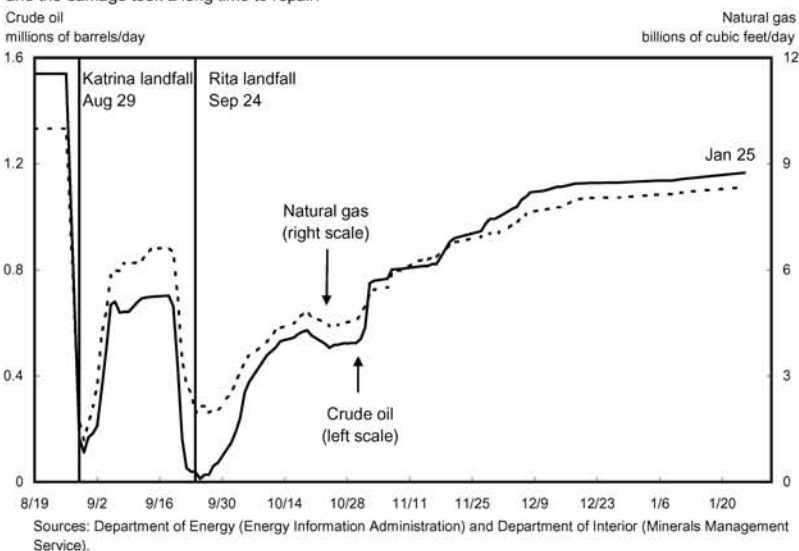
The direct damage to the capital stock and the displacement of labor probably cut real GDP growth by about 0.7 percentage point at an annual rate in the third quarter. Most of this GDP loss was the direct result of destruction of oil and natural gas operations. Although rebuilding of petroleum and natural gas operations was well under way in the fourth quarter, the continuing disruptions likely subtracted about 0.5 percentage point from the annual rate of real GDP growth in that quarter. Hurricane Katrina shut down about 1.4 million barrels per day of oil extraction and 8.8 billion cubic feet per day of natural gas production when it passed through on August 29. Those operations were well on their way to recovery when Hurricane Rita came along for a second strike on September 24, erasing the recovery efforts up to that date (see the chart below). From Katrina's approach through the Gulf of Mexico until the end of the third quarter, oil extraction was cut by an average of 1.08 million barrels per day below normal levels and by an average of 0.7 million barrels per day during the fourth quarter. Similarly, natural gas production was reduced by an average of 5.4 billion cubic feet per day (roughly 10 percent of U.S. output) from Katrina's approach through the end of the third quarter and by an average of 4.0 billion cubic feet per day in the fourth quarter. Damage to refineries cut output by an average of about 2 million barrels per day during September and forced the demand for refined petroleum products to be met by higher imports and a liquidation of inventories. Most refinery output was restored by early-November, however. (Recent energy developments are discussed further in Chapter 11.)

About 782,000 workers filed claims for unemployment insurance (UI) benefits because of the hurricanes (604,000 under the regular UI program and another 178,000 under the Disaster Unemployment Assistance program). The lost production from these workers also subtracted from real GDP growth in the third quarter (after making an allowance to avoid double counting the lost production of

Box 1-1 — continued

Oil and Natural Gas Production since Recent Hurricanes

Hurricanes Katrina (8/29) and Rita (9/24) shut down major amounts of crude oil and natural gas production, and the damage took a long time to repair.



workers in the petroleum and natural gas industries noted earlier). Data from the Current Population Survey indicate the unemployment rate among evacuees was about 12 percent by year end.

According to a Red Cross damage assessment, the three hurricanes destroyed an estimated 213,000 housing units; most of this damage was done by Katrina. Furthermore, 169,000 units suffered major damage (enough to make them uninhabitable), 220,000 had minor damage, and another 235,000 had extremely minor damage. The Bureau of Economic Analysis estimates the loss of residential capital stock at about \$67 billion—about \$37 billion of which was insured. The insured structures are likely to be rebuilt (although not necessarily in the same location), and many of the uninsured structures may be rebuilt as well. The pace of reconstruction is uncertain but is likely to take place over a period of three years or so.

In the aftermath of the hurricanes, the President and Congress worked together to provide disaster relief for the affected areas. Two emergency spending bills provided for \$62 billion of disaster relief, including transfer payments to persons and businesses in the affected areas, direct government purchases of goods and services, and grants to State and local governments. These bills also included funding for

Box 1-1 — continued

the Defense Department and the Corps of Engineers to rebuild military facilities and levees in New Orleans and the Gulf Coast. Additional legislation authorized a reallocation of about \$6 billion from other programs to disaster relief, established \$17 billion of additional borrowing authority for Federal flood insurance programs, and provided about \$15 billion of tax relief for the affected areas.

In the fourth quarter, the Federal disaster spending together with private rebuilding may have partially offset the still-negative effects of petroleum and natural gas operations. By the first quarter of 2006, these post-hurricane effects are expected to combine to produce a clearly positive contribution to real GDP growth.

saving rate fell to a postwar low this year, turning negative in the second quarter and remaining negative through the fourth quarter. A number of factors contributed to growth in consumer spending in 2005; the most important was the increase in energy prices including the transitory post-Katrina surge. Other factors with sizable effects in particular quarters were motor vehicle incentive programs and the loss of rental income from the hurricanes. Rising household net worth during the late 1990s and again over the past two years has provided a more-persistent boost to consumer outlays relative to after-tax income.

Energy Expenditures

Consumer budgets continued to be stretched by higher energy prices in 2005. Consumer energy prices increased about 21 percent during the four quarters of 2005, following an 18-percent increase in 2004 (as measured by the consumption price index in the national income and product accounts). Real consumption of energy was fairly flat in 2005, but because of the higher prices, the share of household income allocated to energy purchases increased sharply. Spending on energy goods and services jumped from 4.2 percent of disposable personal income in 2002 to about 6 percent in October and November of 2005 as the average household's energy budget rose by about \$700 during 2005.

Light Vehicle Expenditures

While annual average sales of cars and light trucks have been remarkably stable over the past six years, much of the quarter-to-quarter volatility in consumer spending generally comes from motor vehicle purchases. Quarter-to-quarter variability in light vehicle sales was particularly evident in 2005. In

July, when General Motors, Ford, and Chrysler each introduced incentive programs on 2005 models, the sales of light vehicles peaked at 20.7 million units at an annual rate. However, motor vehicle sales dropped off in the fourth quarter to 15.8 million units at an annual rate with the removal of the incentive programs. Light vehicle sales for the year as a whole averaged 16.9 million units, however, almost identical to the average pace during the 2000-to-2004 period.

Personal and National Saving

Meanwhile, real purchases outside of energy and motor vehicles grew at their long-standing trend of about 3½-percent growth per year. With energy prices up and other consumption on an unaltered trajectory, most of the funds for these higher-cost energy purchases came from reducing saving. The personal saving rate, which had been generally falling during the preceding 15 years, fell to -0.5 percent for 2005.

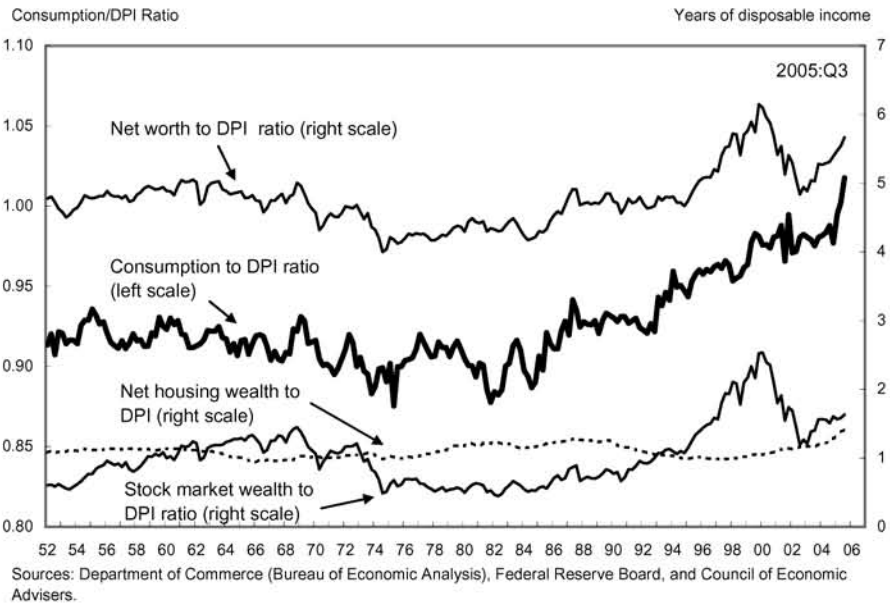
Personal saving is only one part of national saving. The personal saving rate does not include corporate saving in the form of retained earnings; but corporate saving adds to the wealth of corporate shareholders and supplies funds for investment. Net private saving, which includes corporate saving as well as household saving, was 4.3 percent of net national income in the first half of 2005, down from 7.4 percent in the 1990s. A still broader measure of saving, national saving, subtracts dissaving by Federal, state, and local governments (in the form of government budget deficits) from private (public plus corporate) saving. The national saving rate was 1.7 percent in the first half of 2005. (Personal and national saving are discussed further in Chapter 3, *Saving for Retirement*; the international aspects of saving are discussed in Chapter 6, *The U.S. Capital Account Surplus*.)

Wealth Effects on Consumption and Saving

A strong rise in household net worth during the late 1990s and again during the past two years coincided with a sizable increase in consumer spending relative to disposable personal income (Chart 1-1). From 1995 through 2000, in large part because of a booming stock market, the wealth-to-income ratio rose well above its historical range, eventually reaching 6.15 years of disposable income, and the fraction of disposable income spent by consumers rose to new heights as well. The wealth-to-income ratio fell sharply in 2001 and 2002 due to the stock market decline. Since its low point in the third quarter of 2002, the wealth-to-income ratio has again risen sharply. By the third quarter of 2005, it had recovered to about 5.6 years of disposable income, well above the historical average of 4.8. Gains in the stock market accounted for about half of the recovery while increases in net housing wealth accounted for another third.

Chart 1-1 **Consumption & Net Worth (Relative to Disposable Personal Income)**

Consumption gains in 2004 and 2005 were partly supported by increases in wealth, with increases in housing and stock market wealth accounting for most of the increase.



Looking ahead, real consumption growth during the four quarters of 2006 is expected to be somewhere around the 3½-percent trend rate measured during the past three years. Over the near term, the personal saving rate is expected to increase. If energy prices decline in 2006, consumer spending should decline relative to income; to the extent that energy prices remain high, consumer spending may still decline relative to income as consumers reduce energy use and substitute energy alternatives.

Housing Prices

During the past five years, home prices have risen at an annual rate of 9.2 percent. This increase was largely supported by two factors: first, an increase in housing demand, driven by a rise in nominal per capita disposable income of 3.4 percent per year; second, a decline in the cost of financing house purchases, due to a drop in the monthly payment on 30-year fixed-rate mortgages of 4.3 percent per year. Housing demand was also boosted by increased household formation and a strengthening job market. Supply constraints, due to limits on the supply of buildable land in some areas, also contributed to rising prices over the past five years. After falling during 2004, mortgage rates were roughly flat at 5¾ percent in the first three quarters of 2005, and then edged up along with other long-term interest rates in the

fourth quarter. As a result, a well known measure of housing affordability has now fallen to about its average level over its 34-year history.

To gauge the extent to which house price increases have reflected fundamentals, some studies compare housing prices to rents. The rent-to-price ratio is a real rate of return on housing assets in the same way that the earnings-to-price ratio measures the real rate of return on corporate stocks. Viewed as an asset, a home should bear a real return similar to the real return available on alternative assets, such as stocks and bonds. As real interest rates have fallen in the United States and in most other Organization for Economic Cooperation and Development (OECD) countries, the rent-to-price ratio for housing has likewise fallen across a broad range of OECD countries. A recent OECD paper concluded that the decline in the rent-to-price ratio in the United States from 2000 through 2004 was roughly consistent with the decline in interest rates over the same period.

Residential Investment

In response to strong demand and the consequent rise in prices, builders began construction on more than 2 million new homes during 2005, one of the highest rates of homebuilding on record. Similarly, residential investment, at 6 percent of GDP in 2005, was at its highest level since 1955. During 2005, growth of residential construction contributed about half a percentage point to real GDP growth. Homebuilding in 2005 was slightly in excess of the pace of about 1.9 million starts per year that some economists have estimated is compatible in the long run with U.S. rates of household formation and other demographic influences.

During the next five years, the Administration expects the pace of homebuilding to decrease gradually because of demographic trends and slowly rising long-term interest rates. A gradual slowing of homebuilding appears more likely than a sharp drop because the elevated level of house prices will sustain homebuilding as a profitable enterprise for some time. On balance, residential investment is not projected to contribute to real GDP growth during the four quarters of 2006; in subsequent years, it is expected to subtract a bit from overall growth.

Business Fixed Investment

Real business investment in equipment and software grew 8 percent during the four quarters of 2005. This growth is down from the 14-percent year-earlier pace, which was boosted by the end-of-2004 termination of the bonus depreciation provisions of the Jobs and Growth Tax Reconciliation Act. Equipment purchases grew rapidly in mining and oilfield machinery (18 percent) in response to higher prices for oil and natural gas and the need

to replace hurricane-damaged rigs in the Gulf of Mexico. Equipment investment also grew rapidly in the high-tech fields of computers, software, and communications equipment. Investment in industrial and construction equipment grew only moderately (6 percent and 4 percent, respectively). Investment in light trucks was strong through the third quarter, but fell back in the fourth.

In contrast to equipment and software, investment in structures was weak, growing only 1 percent during 2005, after 2.8-percent growth in 2004. Strong growth in the construction of hospitals, shopping centers, and mines (including oil and natural gas rigs) has been offset by declines in the building of electrical power stations, hotels and motels, and amusement and recreation facilities. Office construction fell for the fifth year in a row; however, the 2005 decline was smaller than previous years as office occupancy rates have begun to increase.

The accumulation of internal funds has been more than sufficient to finance business investment during this expansion (Chart 1-2). These funds, also known as *cash flow*, are the sum of undistributed after-tax profits and depreciation. In general, funds for business investment can be generated through borrowing (typically from the bond market, commercial paper market, or banks), issuing new stock, the drawdown of liquid assets, or tapping into cash flow. Historically, business investment has been about 21 percent higher than cash flow, with firms raising most of the extra funds in credit markets. In contrast, business investment during this expansion has not kept pace with cash flow. As a consequence, corporate liquid assets have now built up to levels that are well above any that have been seen during the past decade and a half. This buildup in liquid assets implies that financing for future investment should be readily available. However, the buildup may reflect greater overall caution among business executives and owners, a shift in sentiment that could dampen future investment.

During the next couple of years, investment in equipment and software is likely to maintain the same rapid growth as in 2005, as output continues to grow and businesses remain flush with cash. Investment in business structures is projected to accelerate as new oil and gas rigs are built and as continued declines in vacancy rates support the construction of new office buildings.

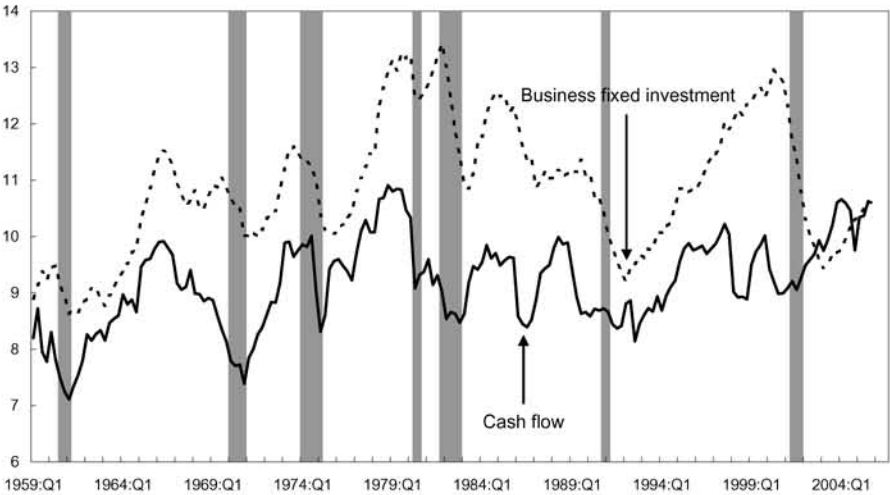
Business Inventories

The pace of inventory investment in 2005 was below the 2004 pace and on average subtracted from overall GDP growth during the first three quarters of the year. As sales grew during the year, the inventory-to-sales ratio continued to decline. Indeed, the inventory-to-sales ratio has fallen considerably since the mid-1980s. In 2005, businesses held inventories equal to about 27 business-days' worth of sales—about three days' worth of sales less than they held in 2000, and about seven days' less than in 1985. The trend toward leaner

Chart 1-2 **Business Fixed Investment and Cash Flow**

Business fixed investment and cash flow tend to move up and down together, although BFI usually exceeds cash flow. During this expansion, in contrast, BFI is not higher than cash flow.

Share of Potential GDP



Note: Potential GDP is the level of GDP consistent with full employment. BFI data available through 2005:Q4; cash flow data available through 2005:Q3. Shaded areas indicate recessions.

Sources: Department of Commerce (Bureau of Economic Analysis) and Congressional Budget Office.

inventories has been evident in manufacturing since the mid-1980s, and has appeared in retailing and wholesaling since at least 2000. Leaner inventories suggest that new business practices such as just-in-time inventory control in manufacturing and computer- and Internet-assisted supply-chain management continue to become more popular among supply managers.

Inventory investment generally makes little contribution to real GDP growth when the growth of final sales is roughly stable from year to year. (In contrast, inventory investment *is* important in the early phases of business-cycle recessions and recoveries.) With the economy in the midst of an ongoing expansion, and the Administration expecting fairly smooth growth of final sales during the next several years, inventory investment is not anticipated to be a major contributor to annual GDP growth. The economy-wide inventory-to-sales ratio is expected to trend lower over the projection period.

Government Purchases

Federal Government purchases as well as transfers and grants (such as Social Security, Medicare, and Medicaid) contributed to real GDP growth during 2005. Federal purchases contributed 0.2 percentage point at an annual rate to real GDP growth in the first half of the year, and about 0.5 percentage point in the third quarter. Almost all of these contributions were from the defense budget, largely a by-product of the reconstruction and military operations in

Iraq and Afghanistan. Despite the developments in Iraq and the hurricane-relief efforts, however, Federal spending in fiscal year 2005 (which runs from October 2004 to September 2005) was \$7 billion below last year's projection in the FY 2006 budget. An additional \$62 billion has been authorized so far for hurricane-disaster relief. Although these funds were authorized in FY 2005, the hurricanes struck near the end of the fiscal year, and so most of the funds will be disbursed in FY 2006 and beyond.

Federal Government purchases and the consumer spending that results indirectly from Federal transfers will add to real GDP growth in early 2006. Federal outlays for FY 2006 are likely to increase largely due to hurricane-disaster relief and because of additional funds for reconstruction and counterinsurgency in Iraq.

From FY 2007 forward, however, the impact of Federal outlays is projected to move sharply toward restraint. For example, Federal outlays are projected to shrink by 0.7 percentage point of GDP in FY 2007. The shrinking of the Federal Government's claim on resources should allow private economic activity more room to grow.

Exports and Imports

Real exports grew 5½ percent during the four quarters of 2005, about the same as export growth in 2004. This reflects the interaction of two offsetting influences: the somewhat faster growth of our trading partners in 2005, which tends to increase the demand for U.S. exports, and the increase in the exchange value of the dollar, which tends to dampen export demand by making U.S. goods relatively more expensive. Real GDP growth among our OECD trading partners picked up a bit to 2.6 percent during the four quarters of 2005 from a 2.1-percent pace in 2004, as computed from the latest OECD projections. Offsetting the effect of stronger foreign growth on our exports was a 7-percent rise in the value of the dollar against major currencies over the 12 months of 2005.

Data on the destination of U.S. exports show the fastest export growth to the most rapidly developing countries and regions such as Asia and Africa. Nevertheless, our OECD trading partners still account for more than two-thirds of our exports.

Growth of our real exports in 2006 and 2007 is likely to be similar to that in 2005, because economic growth in our export markets is likely to be about the same as in 2005. The OECD projects that real GDP growth among our OECD trading partners (2.6 percent during the four quarters of 2005) will be 2.5 percent and 2.8 percent in 2006 and 2007, respectively. Growth of real exports to rapidly developing countries in Asia and Africa will likely continue to be healthy over the next two years as their economic expansion leads them to demand more goods and services from abroad.

Growth in real imports slowed substantially during the four quarters of 2005 to 4.6 percent from 10.6 percent in 2004. Imports grew more slowly than exports during 2005. Import growth was particularly weak in the second and third quarters and was fairly widespread, affecting imports of consumer goods, non-auto capital goods, petroleum products, and services. Imports picked up in the fourth quarter, particularly for petroleum products to replace domestic production lost because of the damage caused by the hurricanes.

The current account deficit (the excess of imports and income flows to foreigners over exports and foreign income of Americans) averaged 6.4 percent of GDP (\$790 billion at an annual rate) during the first three quarters of 2005, up from 5.7 percent of GDP during 2004. Recent increases in the deficit reflect faster growth in the United States than among our trading partners, making our imports grow faster than our exports. The longer-term trend also reflects faster growth of domestic investment than domestic saving with foreign saving filling in the gap in financing.

The United States has been able to buy more goods and services than it sells because foreigners have been investing in the United States. The current account deficit of \$790 billion also represents the net increase in foreign holdings of U.S. assets (either financial assets or direct ownership of corporations) relative to U.S.-owned assets abroad. In the future, the returns from these foreign-owned U.S. investments (that is, interest, dividends, and reinvested earnings) will themselves add to the current account deficit. These ideas are explored more fully in Chapter 6, The U.S. Capital Account Surplus.

Employment

Nonfarm payroll employment increased by 2.0 million during the 12 months of 2005, an average pace of 168,000 jobs per month. The unemployment rate declined by 0.5 percentage point to 4.9 percent during the 12 months of the year. The average unemployment rate in 2005 (5.1 percent) was below the averages of the 1970s, the 1980s, and the 1990s. During the first eight months of 2005, employment growth averaged 196,000 per month, but dropped to only 21,000 per month in September and October immediately after the hurricanes. The Bureau of Labor Statistics expects a slight downward revision to employment growth over the 12 months ended in March 2005.

Job gains were spread broadly across major industry sectors in 2005. The service-providing sector accounted for 88 percent of job growth during the 12 months of the year, a slightly larger contribution than would be suggested by its 83 percent of overall employment. The goods-producing sector accounted for the remaining 12 percent of the gains, notably weaker than its 17-percent share of overall employment. Within the goods-producing sector, over-the-year employment growth was concentrated in construction and

mining, while manufacturing employment decreased for the seventh time in the past eight years.

By educational attainment, the drop in the unemployment rate during 2005 was most pronounced among those without a high school degree; the jobless rate in this group tumbled 0.7 percentage point during the 12 months of the year. By race and ethnicity, the unemployment rate fell the most among blacks and Hispanics, (1.5 and 0.5 percentage points, respectively), in contrast to 0.3 percentage point for whites. By age, the jobless rate fell most among teenagers 16 to 19 years old. By sex, the jobless rate fell more among adult men than adult women. The median duration of unemployment, an indicator that typically follows the business cycle with a substantial lag, declined from 9.4 weeks in December 2004 to 8.5 weeks in December 2005. In general, unemployment rates fell the most in 2005 among those groups with the highest rates at the end of 2004.

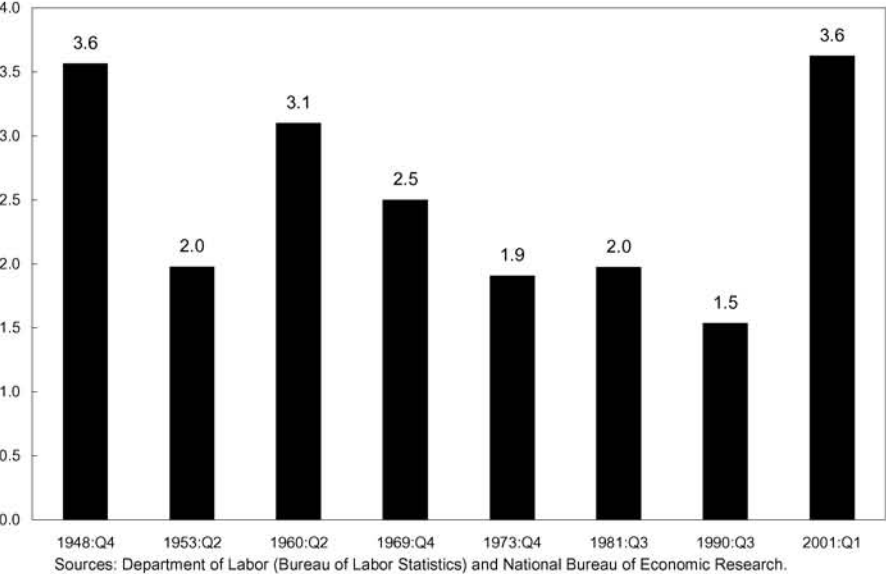
The Administration projects that employment will increase at a pace of 176,000 per month on average during the 12 months of 2006—roughly in line with the Philadelphia Federal Reserve Bank's survey of professional forecasters. The Administration projects the unemployment rate will remain at about 5.0 percent throughout 2006.

Productivity

Labor productivity growth in the nonfarm business sector has been exceptionally vigorous, exceeding the forecasts of most economists. Productivity (real output per hour worked) grew at a 3.4-percent annual rate during the first three quarters of 2005, following similar or higher growth rates during the three preceding years. Since the business-cycle peak in the first quarter of 2001 (a period that includes a recession and a recovery), productivity has grown at an average 3.6-percent annual rate, notably higher than during any comparable 4½-year period since 1948 (Chart 1-3). Although 1995 has been regarded as a watershed year for productivity because of the acceleration of productivity from a 1.5-percent to a 2.4-percent annual rate of growth, the further acceleration to a 3.6-percent annual rate of growth during 2001 to 2005 is even more striking (the precise time periods are shown in Table 1-2, later in this chapter). The 1995-2001 acceleration may be plausibly accounted for by a pickup in capital services per hour worked and by increases in *organizational capital*, the investments businesses make to reorganize and restructure themselves, in this instance in response to newly installed information technology.

In contrast, capital deepening (the increase in capital services per hour worked) does not explain any of the post-2001 increase in productivity; in fact, the growth of capital services per hour worked appears to have fallen off slightly in this period. The post-2001 acceleration in productivity, therefore,

Chart 1-3 Productivity Growth During Cyclically-Comparable Business Cycle Intervals
 Productivity growth during the first 4½ years since the 2001:Q1 business-cycle peak is as high or higher than during any cyclically-comparable period during the postwar era.
 Percent change, annual rate during the 4 ½ years beginning with each business-cycle peak



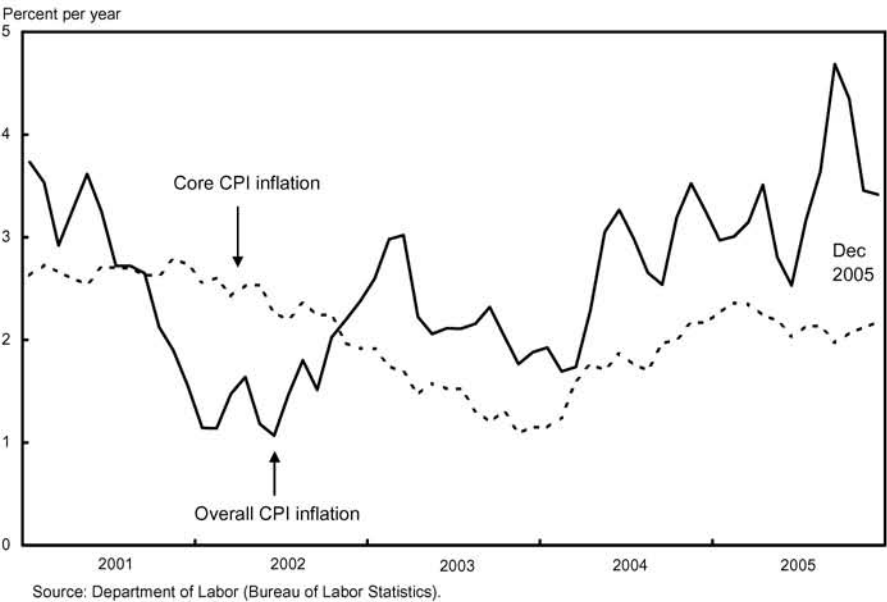
appears to be accounted for by factors that are more difficult to measure than the quantity of capital, such as continuing improvements in technology and in business practices.

One curious aspect of productivity acceleration has been its limited spread. Business-sector productivity growth has been higher in the United States than in any other major industrial economy. (Business-sector productivity growth has also been rapid in Ireland, Greece, Korea, Turkey, the Scandinavian countries, and several transitional east-European countries.) As every industrial economy has access to the same technology, the strong U.S. performance suggests that other structural features of the U.S. economy may also play an important role in productivity growth. Some research suggests that, all else equal, countries with more-flexible, less-heavily regulated product and labor markets are better able to translate technological advances into productivity gains.

Rather than assume that the recent remarkable pace of productivity growth will continue, the Administration believes it is prudent to build a budget based on a forecast somewhat lower than the 3.6-percent pace of productivity growth since 2001. Productivity is projected to average 2.6 percent per year during the six-year span of the budget projection—roughly equal to the average annual pace during the past decade.

Chart 1-4 **Inflation**

Core CPI inflation (which excludes food and energy) has remained moderate and stable in the face of the recent uptick in overall CPI inflation.



Wages and Prices

As measured by the Consumer Price Index (CPI), overall inflation increased in 2005 to 3.4 percent from 3.3 percent during the 12 months of 2004. Rapid increases in energy prices (16.6 percent and 17.1 percent in 2004 and 2005, respectively) elevated the level of overall inflation in both years. The four major energy subindexes (gasoline, fuel oil, natural gas, and electricity) all posted large increases in 2005, with prices of natural gas and electricity advancing faster than in the preceding year. Food price inflation, at 2.3 percent, was moderate and little changed from the year-earlier pace. Core CPI prices (which exclude the prices of food and energy) increased 2.2 percent during 2005, substantially below the overall inflation rate and the same as the year-earlier pace.

Labor costs (which comprise about 62 percent of the costs of nonfarm business) have been stable, or possibly trending lower. Hourly compensation for workers in private industry increased at a 3.0-percent annual rate during the 12 months ended in September 2005 down from 3.7 percent during the year-earlier period according to the Employment Cost Index (ECI), which is compiled from the National Compensation Survey (NCS). The deceleration occurred in both wages and salaries (with growth down to 2.2 percent from 2.6 percent in the year-earlier period) and hourly benefits (which slowed to 4.8 percent from 6.8 percent). The slowing in hourly benefits was accounted for primarily by smaller increases in contributions to defined-benefit pension

programs in 2005 than in 2004 according to other tabulations from the NCS. Hourly benefits have increased notably faster than hourly wages and salaries in each of the past four years. Another measure of hourly compensation published by the Department of Labor and derived from the national income and product accounts (NIPA) has increased notably faster than the ECI measure, rising 5.0 percent during the four quarters ended in the third quarter of 2005. The difference between these two measures may be partly attributable to the exercise of stock options which are included in the NIPA-derived measure at the time they are exercised, but are not recorded by the NCS.

With hourly compensation growing in the 3.0 percent-to-5.0 percent range (depending on the index) and labor productivity growth at about 3.0 percent, trend unit labor costs have barely changed, with increases in the range from 0 percent to 2 percent. Because unit labor costs have increased by less than the 2.9-percent increase in the GDP price index during the four quarters through the third quarter of 2005, labor costs do not appear to be putting upward pressure on inflation.

An important determinant of inflation during the next year is likely to be energy prices, whose run-up during the past two years has been the main reason for the increase in inflation. Futures markets suggest roughly stable oil and natural gas prices, which (if they come to pass) will remove some of the upward pressure on the overall inflation rate.

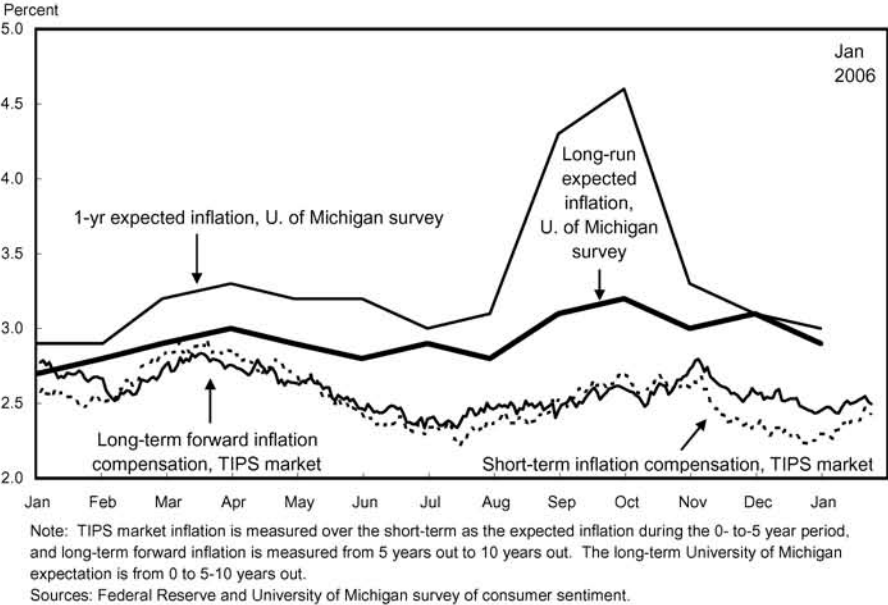
Although some measures of short-run inflation expectations increased around the third quarter of 2005, they fell back later in the year. More importantly, a variety of longer-term measures of inflation expectations have been approximately stable during the past two years, including those derived from the market for Treasury Inflation-Protected Securities (TIPS) and the University of Michigan consumer survey (Chart 1-5). History suggests that the stability of inflation expectations promotes stability in actual inflation as well as in the overall economy.

The Administration expects CPI inflation to stabilize at 2.4 percent during the next several years, up only slightly from the 2.2 percent increase in the core CPI during the 12 months through December. The projected path of inflation as measured by the GDP price index is similar, but a bit lower. Inflation by this measure is projected at 2.2 percent during the four quarters of 2006 and 2007, down from the 3.0-percent increase during 2005. These inflation projections are very close to those of a year ago, and are also very close to those of the consensus of professional forecasters.

The “wedge,” or difference, between the CPI and the GDP measures of inflation has implications for the Federal budget projections. A larger wedge (with the CPI rising faster than the GDP price index) raises the Federal budget deficit because cost-of-living programs rise with the CPI, while Federal revenue tends to increase with the GDP price index. For a given level

Chart 1-5 **Survey and Market Measures of Expected Inflation in 2005 and 2006**

Although 1-year consumer expectations spiked around October, consumers' long-term expectations and expectations derived from the TIPS market remained moderate and stable.



of nominal income, increases in the CPI also cut Federal revenue because they raise income tax brackets and affect other inflation-indexed features of the tax code. Of the two indexes, the CPI tends to increase faster in part because it measures the price of a fixed basket of goods. In contrast, the GDP price index increases less rapidly because it allows for households and businesses shifting their purchases away from items with increasing relative prices and toward items with decreasing relative prices. Among other differences, the GDP price index places a larger weight than does the CPI on computers, which tend to decline in price (on a quality-adjusted basis). In addition, the CPI places a much larger weight on energy.

During the 13 years ended in 2004, the wedge between inflation in the CPI-U-RS (a historical CPI series designed to be consistent with current CPI methods) and the rate of change in the GDP price index averaged 0.36 percent per year. The wedge was particularly high during the first three quarters of 2005 when the CPI increased 1 percentage point faster than the GDP price index; this difference reflected the roughly 50-percent annual rate of increase in crude oil prices, which have a larger weight in consumer prices than in GDP as a whole. Since domestic production accounts for only about 35 percent of U.S. oil consumption, the weight of oil prices in GDP is roughly one-third of its weight in consumption. As this boost from higher oil prices unwinds over the next couple of years, the wedge between the CPI and GDP

inflation is likely to be lower than average. From 2008, the wedge is projected to average 0.3 percentage point.

Financial Markets

The Wilshire 5000 (a broad stock price index) increased 4.6 percent during 2005, the third consecutive year of stock market gains following three years of declines. The 2005 increase was well below the gains of the two preceding years.

Short-term interest rates increased during the year as the Federal Reserve’s Open Market Committee raised the target Federal funds rate by 25 basis points at each of its eight meetings. As a consequence, rates on 91-day Treasury bills rose 1.7 percentage points during the year.

Despite the increases in short-term rates, yields on 10-year Treasury notes remained low, increasing only 24 basis points during the 12 months of 2005 (Chart 1-6). The low level of long-term interest rates was due, in part, to low and stable long-run inflation expectations. At the end of 2005 the gap between the yield on 10-year Treasuries and the rate on 91-day Treasury bills was only about 0.6 percentage point, noticeably lower than its historical average. (The yield on longer-term Treasury notes is usually higher than on shorter-term notes because the market compensates investors for the extra risk of holding longer-term securities.)

Chart 1-6 10-Year Treasury Yield

Yields on 10-year Treasury notes remained near decade lows during 2005 in the face of sharp increases in short-term rates.

Percent per annum



Source: Federal Reserve Board.

Yields on corporate bonds also remained low and the spread between yields on corporate bonds (which carry more risk) and the yields on more-secure obligations of the U.S. Treasury remained small. Measured relative to Treasury obligations of similar maturities, the yields on corporate bonds rated “BAA” (about average quality) by Moody’s Investor Services remained near their lowest levels over the past decade (Chart 1-7). This suggests that the perceived default risk of U.S. corporations remains low.

The Long-Term Outlook Through 2011

The U.S. economy continues to be well positioned for long-term growth. The Administration projects that real GDP will expand at about its potential rate (between 3.1 percent and 3.3 percent per year) through 2011, inflation will remain low and stable (with the CPI increasing at around 2.4 percent per year), and the labor market will remain firm (Table 1-1). The forecast is based on conservative economic assumptions that are close to the consensus of professional forecasters. These assumptions provide a prudent and cautious basis for the Administration’s budget projections.

Chart 1-7 **Corporate Bond Yield Spreads**

In 2005, the spread between the yield on average quality (Baa-rated) corporate securities and Treasury notes were at the low end of the past decade’s range.

Percentage points per annum



Source: Federal Reserve Board.

TABLE 1-1.—*Administration Forecast*¹

Year	Nominal GDP	Real GDP (chain-type)	GDP price index (chain-type)	Consumer price index (CPI-U)	Unemployment rate (percent)	Interest rate, 91-day Treasury bills ² (percent)	Interest rate, 10-year Treasury notes (percent)	Nonfarm payroll employment (millions)	Nonfarm payroll employment (average monthly change, Q4-to-Q4 thousands)
	Percent change, Q4-to-Q4				Level, calendar year				
2004 (actual)...	6.8	3.8	2.9	3.4	5.5	1.4	4.3	131.5	178
2005	6.4	3.5	2.8	3.8	5.1	3.2	4.3	133.6	160
2006	5.6	3.4	2.2	2.4	5.0	4.2	5.0	135.5	176
2007	5.6	3.3	2.2	2.4	5.0	4.2	5.3	137.4	140
2008	5.4	3.2	2.1	2.4	5.0	4.3	5.5	139.0	139
2009	5.3	3.1	2.1	2.4	5.0	4.3	5.6	140.7	132
2010	5.3	3.1	2.1	2.4	5.0	4.3	5.6	142.2	127
2011	5.3	3.1	2.2	2.5	5.0	4.3	5.6	143.7	126

¹Based on data available as of November 15, 2005.

²Discount basis.

Sources: Council of Economic Advisers, Department of Commerce (Bureau of Economic Analysis), Department of Labor (Bureau of Labor Statistics), Department of the Treasury, and Office of Management and Budget.

Growth in GDP over the Long Term

The Administration projects that real GDP will grow at a slowly diminishing rate from 2005 through 2009, decelerating year by year from a forecasted 3.5-percent rate during the four quarters of 2005 to 3.1 percent in 2009, roughly in line with the consensus forecast for those years. The year-by-year pace is close to the estimated growth rate of potential real GDP growth (a measure of the rate of growth of productive capacity). The unemployment rate is projected to remain flat at 5.0 percent. As discussed below, potential GDP growth is expected to slow in the near term as productivity growth reverts toward its long-run trend, and potential GDP is expected to slow further during the 2007-to-2011 period as labor force growth declines.

The projected growth of potential real GDP, 3¼ percent during the next two years, is in line with recent experience. Potential growth is the rate of real GDP growth that can be achieved while the unemployment rate remains stable. For example, during the past four years (from the third quarter of 2001 to the third quarter of 2005) real GDP growth was 3.22 percent at an annual rate while the unemployment rate was unchanged—on net—at about 5 percent.

The growth rate of the economy over the long run is determined by its supply-side components, which include population, labor force participation, the ratio of nonfarm business employment to household employment, the workweek, and the growth in output per hour. The Administration's forecast for the contribution of the growth rates of different supply-side factors to real GDP growth is shown in Table 1-2.

As can be seen in the fourth column of the table, the mix of supply-side factors determining real GDP growth has been unusual since the business-cycle peak at the beginning of 2001, with the exceptionally high productivity growth (3.6 percent at an annual rate) partially offset by declines in the participation rate (line 2) and the workweek (line 8). Also puzzling is the large decline in the ratio of nonfarm business employment to household employment (line 6). This unusual decline reflects the slow growth of employment

TABLE 1-2.—*Supply-Side Components of Real GDP Growth, 1953–2011*
[Average annual percent change]

Item	1953 Q2 to 1973 Q4	1973 Q4 to 1995 Q2	1995 Q2 to 2001 Q1	2001 Q1 to 2005 Q3	2005 Q3 to 2011 Q4
1) Civilian noninstitutional population aged 16+ ¹	1.6	1.4	1.2	1.2	1.1
2) Plus: Civilian labor force participation rate	0.2	0.4	0.1	-0.3	-0.1
3) Equals: Civilian labor force ²	1.8	1.8	1.4	0.9	1.0
4) Plus: Civilian employment rate	-0.1	0.0	0.3	-0.2	0.0
5) Equals: Civilian employment ²	1.7	1.8	1.7	0.7	1.0
6) Plus: Nonfarm business employment as a share of civilian employment ^{2,3}	-0.1	0.1	0.4	-0.8	0.1
7) Equals: Nonfarm business employment.....	1.6	1.9	2.0	-0.1	1.0
8) Plus: Average weekly hours (nonfarm business)	-0.3	-0.3	-0.1	-0.3	-0.1
9) Equals: Hours of all persons (nonfarm business).....	1.3	1.6	1.9	-0.4	1.0
10) Plus: Output per hour (productivity, nonfarm business)	2.5	1.5	2.4	3.6	2.6
11) Equals: Nonfarm business output.....	3.8	3.1	4.3	3.2	3.6
12) Plus: Ratio of real GDP to nonfarm business output ⁴	-0.2	-0.2	-0.5	-0.4	-0.4
13) Equals: Real GDP	3.6	2.8	3.8	2.8	3.2

¹ Adjusted by CEA to smooth discontinuities in the population series since 1990.

² BLS research series adjusted to smooth irregularities in the population series since 1990.

³ Line 6 translates the civilian employment growth rate into the nonfarm business employment growth rate.

⁴ Line 12 translates nonfarm business output back into output for all sectors (GDP), which includes the output of farms and general government.

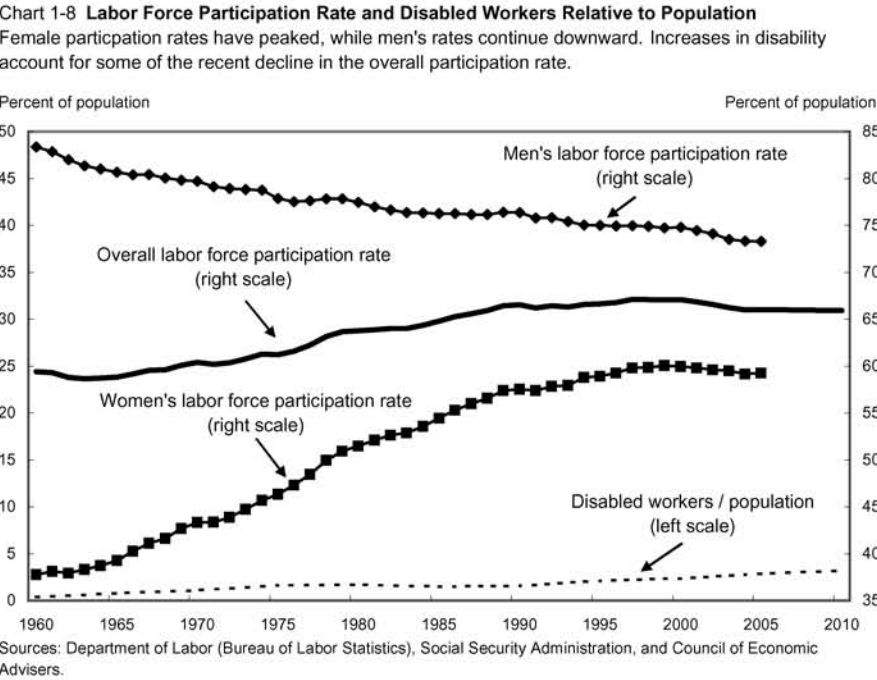
Note: 1953 Q2, 1973 Q4, and 2001 Q1 are NBER business-cycle peaks. Detail may not add to total because of rounding.

Sources: Council of Economic Advisers, Department of Commerce (Bureau of Economic Analysis), and Department of Labor (Bureau of Labor Statistics).

as measured by the payroll survey (which asks employers to report the number of employees) relative to the more-rapid growth of employment as measured by the household survey (in which people report the employment status of their household members)—a disparity that has not yet been explained.

The participation rate fell from 2001 to 2005, and is projected to trend lower through 2011. The recent behavior stands in contrast to the long period of increase from 1960 through 1996 (Chart 1-8). The participation rate appears to have topped out in 1997-2000 before declining. The reversal of direction reflects nothing new about the participation rate for men, which continued a downward trend that began shortly after the end of World War II. Rather, the new factor at play is the change in the trend in the female participation rate, which has edged down on balance since 2000 after having risen for five decades.

Another factor in the decline in the labor force participation rate has been the increase in the number of workers collecting insurance for disability retirement. The 0.5-percentage point increase (as a share of the working-age population) since 2000 accounts for about half of the overall decline, and appears to be largely a reflection of increases in the number of workers entering high-disability ages (50+ years old).



Looking ahead, the participation rate is projected to decline slowly, reflecting the aging of the baby-boom cohorts, leading to more retirements and a likely increase in the share of disabled workers. Baby boomers are currently in their forties and fifties, and over the next several years they will move into older age brackets which typically have lower participation rates. The decline in the participation rate may quicken after 2008 when the first baby-boom cohort reaches Social Security's early retirement age of 62.

Interest Rates over the Near and Long Term

The Administration forecast of interest rates is based on financial market data as well as results of a survey of economic forecasters. As of November 15, 2005, the date that the forecast was finalized, trading in financial futures suggested that market participants expected short-term interest rates to rise a bit further, and the Administration's interest-rate projections reflect those views. Taking its cue from financial futures markets, the Administration projects the rate on 91-day Treasury bills to increase to about 4.2 percent by 2007 and to about 4.3 percent from 2008 to 2011. At that level, the real interest rate on 91-day Treasury bills will be close to its historical average.

The yield on 10-year Treasury notes on November 14 was 4.61 percent, just 68 basis points above the (discount) rate on 91-day Treasury bills. This difference was very low relative to its historical average, and the Administration expects it to increase gradually during the six-year forecast period. As a result, yields on 10-year notes are expected to increase somewhat further, reaching a plateau at 5.6 percent from 2009 onward.

The Composition of Income over the Long Term

A primary purpose of the Administration's economic forecast is to estimate future government revenues, which requires a projection of the components of taxable income. The Administration's income-side projection is based on the historical stability of the long-run labor compensation and capital share of gross domestic income (GDI). (GDI is the sum of all income components and differs from GDP only by measurement error—which can be substantial.) During the first three quarters of 2005, the labor compensation share of GDI was 57.6 percent (according to the advance data available when the projection was finalized), slightly below its 1963-2004 average of 58.1 percent. From this jump-off point, the labor share is projected to slowly rise to 58.1 percent by 2011.

The labor compensation share of GDI consists of wages and salaries (which are taxable), nonwage compensation (employer contributions to employee pension and insurance funds—which are not taxable), and employer contributions to social insurance (which are not taxable). The Administration

forecasts that the wage and salary share of compensation will be roughly stable during the budget window. One of the main factors boosting nonwage compensation during 2002-2004 was employer contributions to defined-benefit pension plans. As noted earlier, the National Compensation Survey for 2005 shows a moderation of these contributions, suggesting that the period of very rapid catch-up contributions may be behind us.

The capital share of GDI is expected to edge down from its currently high level before stabilizing near its historical average. Within the capital share, depreciation is expected to increase (a result of the strong growth of investment during the past three years). After adjusting for the temporary effects of the hurricanes, profits in the third quarter of 2005 were about 11.6 percent of GDI, well above their post-1959 average.

Book profits (known in the national income and product accounts as “profits before tax”) jumped up in the first quarter of 2005 in large part because of the termination of the temporary provision for expensing of equipment investment under the Job Creation and Worker Assistance Act of 2002 and the Jobs and Growth Tax Relief and Reconciliation Act of 2003. These expensing provisions reduced taxable profits from the third quarter of 2001 through the fourth quarter of 2004. The legacy of these expensing provisions increases book profits from 2005 forward, however, because investment goods expensed during the three-year expensing window will have less remaining value to depreciate. The share of other taxable income (the sum of rent, dividends, proprietors’ income, and personal interest income) is projected to fall in coming years, mainly because of the delayed effects of past declines in long-term interest rates, which reduce personal interest income during the projection period. In addition, rental income has been—and is projected to continue—trending down as a share of GDI.

Conclusion

The economy has shifted from recovery to sustained expansion, having absorbed the effects of the third-quarter hurricanes and large increases in energy prices. The economy is projected to settle into a steady state in which GDP grows at its potential rate, the unemployment rate remains flat at a low level, and inflation remains moderate and stable. Consumer spending remains strong, businesses are continuing to invest, and exports are growing faster than domestic production. Having said this, we must remember that economic forecasting is difficult, and no doubt unforeseen positive and negative developments will affect the course of the economy over the next few years. Given the economy’s fundamental strengths, however, prospects remain good for continued growth in the years ahead. Nevertheless, much work

remains in making our economy as productive as possible. Later chapters of this *Report* explore how pro-growth policies, such as improving incentives in health care, promoting free trade, reforming our retirement and tax systems, and boosting the skills of the U.S. workforce can enhance our economic performance.

Skills for the U.S. Workforce

A strong U.S. economy requires a skilled and well-educated workforce that is prepared to meet the challenges presented by a rapidly changing world economy. Research has found, for example, that countries with higher levels of education and higher average math and science test scores experience faster economic growth. For more than a half-century, the United States experienced an extraordinary rise in education levels and still maintains one of the best-educated populations in the world. But in recent years, improvements in educational attainment have slowed. Today, for example, younger Americans are less educated, on average, than their counterparts in a number of advanced countries. In addition, U.S. high school students also score below students in most other advanced countries in their math and science skills. To remain competitive in the global economy, the United States needs to improve the education and skills of its residents and prepare them for jobs that will be available in the future.

This chapter discusses the importance of the education and skill levels of the U.S. workforce, the contributions of legal immigrants to the skills of the U.S. workforce, and the importance of upgrading workforce skills through job training. The key points of this chapter are:

- Education is a key contributor to economic growth and individual income.
- Advances in education levels have slowed over the past 25 years. This slowdown could jeopardize the U.S. standard of living in years to come.
- Legal immigrants make up a vital part of the U.S. economy, particularly in the science and engineering sectors.
- Workers need to continually upgrade their skills if they are to adapt to and take part in a continually changing economy.

By setting its sights on improving the education and skills of U.S. workers, the United States can create a workforce that will thrive in the fast-changing world economy.

Educational Achievement in the United States

Both economic research and common sense suggest that workers' skills play a critical role in economic growth and individual well-being. In the past, rapid increases in schooling levels helped to raise the U.S. standard of living, but in

recent years improvements in educational attainment have slowed. Unless the United States can improve the educational achievement of its residents, it may be difficult to sustain rapid economic growth in the future.

Workforce Skills and the U.S. Standard of Living

Education and Income

Economic research suggests that educational attainment and test scores are important at both the individual and the national level. At the individual level, people with higher levels of education have higher earnings than people with less education. In 2004, workers with a bachelor’s degree only (no advanced degree) earned almost \$23,000 more per year on average than workers with a high school degree only (see Table 2-1). These differences have grown over time: In 1975, workers with only a bachelor’s degree earned \$14,220 more per year (in 2004 dollars) than high-school educated workers. According to a U.S. Census Bureau study, over his or her lifetime, a worker with only a bachelor’s degree earns nearly \$1 million more (in 2004 dollars) than a worker with a high school degree only.

In addition to income, schooling levels are associated with other positive economic and social outcomes. More-educated adults are less likely to be unemployed or incarcerated than less-educated adults. More-educated adults are healthier and have lower mortality rates than less-educated adults. They are also more likely to have college-educated children, thereby passing the benefits of higher levels of education on to future generations.

Studies have also shown that higher test scores are associated with higher wages and more years of schooling. High school students with higher test scores are more likely to attend college and, if they attend, are more likely to graduate. Controlling for individuals’ educational attainment and family background, those who score higher on achievement tests in high school have higher wages later in life.

TABLE 2-1.— *Average Annual Earnings by Education (2004 dollars)*

	1975	1990	2000	2004
Bachelor’s degree only	39,065	43,591	54,396	51,568
High school degree only	24,845	24,968	28,179	28,631
\$ difference	14,220	18,623	26,217	22,937
% difference	57%	75%	93%	80%

Note: Data refer to all workers aged 18 and older.
Source: Department of Commerce (Bureau of the Census).

Education and U.S. Standard of Living

Higher schooling levels and test scores do not just improve individual outcomes, they also raise the standard of living for the country as a whole. More-skilled workers are typically better at identifying, adapting, and implementing ideas that lead to higher productivity growth. Productivity growth raises the standard of living because it leads to real increases in workers' wages. Research has found that, all else equal, countries with higher levels of education and higher average math and science test scores experience faster economic growth. A recent study of U.S. growth between 1950 and 1993 found that one-third of productivity growth over this period was due to increased levels of education.

Education and skills are critical for economic growth, but other factors, such as openness to trade and government institutions that protect private property, are also important. The United States tends to score highly in these areas compared with its international peers, which may help to explain why the United States has experienced faster economic growth than most other advanced countries over the last decade.

Educational Attainment

For more than a half-century, education levels have been rising in the United States. In 2004, about 85 percent of adults aged 25 and older reported that they had completed high school; 28 percent of adults had attained a bachelor's degree or higher (see Chart 2-1). This is an extraordinary rise since the mid-twentieth century, when only about 36 percent of adults had a high school diploma and around 6 percent had a bachelor's degree or higher.

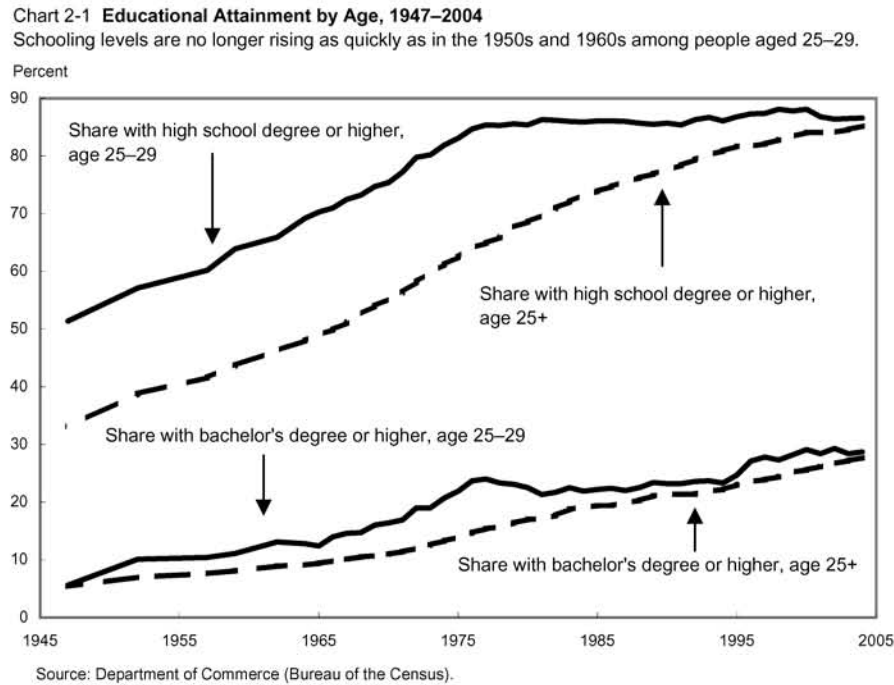
This rapid rise in educational attainment came about mainly because, for many years, each generation was more educated than the one before: Each generation was more likely than the previous one to have completed high school or attained a bachelor's degree. As older, less-educated workers retired and younger, more-educated workers entered the workforce, the overall education level of the U.S. workforce grew rapidly.

Over the past 25 years, however, this pattern has changed. According to some measures, younger generations have been no more educated than previous ones. The share of U.S. residents aged 25–29 who have completed high school has remained relatively constant over this time, staying within a range of about 85 percent to 88 percent (see Chart 2-1). Over the same period, the manner in which people complete high school has changed. People counted as having completed high school include both those who graduate from high school and those who receive a General Education Development (GED) certificate or another alternative to a regular high school diploma. (The GED is a certificate awarded to applicants who pass a specific,

approved, high-school equivalency exam.) Over time, GED recipients have made up an increasing share of this group. In 1999, of 18- to 24-year-olds who had completed high school, about 11 percent obtained a high school credential via a GED, up from 5 percent in 1988. While GED recipients are counted as people who have completed high school, studies suggest that they are not equivalent to high school graduates in their economic outcomes. For instance, GED recipients have lower earnings and are less likely to obtain post-secondary education than are high school graduates. These differences in economic outcomes are of concern given that GED recipients make up an increasing share of those who have completed high school.

Unlike the share of people who have completed high school, the share of people aged 25–29 who have a bachelor’s degree or higher has continued to rise. This share, however, is rising more slowly than it was 25 years ago. Over the past 25 years, it rose 6 percentage points, from 23 percent in 1979 to 29 percent in 2004. In contrast, in the 25 years prior to 1979, it increased by about 13 percentage points, or more than twice as much.

Although schooling levels, already relatively high in the United States, cannot grow indefinitely, international comparisons of educational attainment suggest that the United States still has great potential for increases in the schooling levels of its residents. These comparisons show that younger U.S. residents have lower levels of education than their counterparts in a number of other advanced



countries. In 2002, for example, half of young people in Canada and Japan had attained a college degree (an associate's or bachelor's degree or higher), compared with 39 percent of young people in the United States.

Many students exit college without obtaining a bachelor's degree. In 2004, about one-quarter of adults had attended a post-secondary institution but had not completed a bachelor's degree. People who complete some college without obtaining a bachelor's degree are a diverse group. Some attain an academic or vocational associate's degree or certificate, while others drop out of college without completing a single semester. Some attend a four-year college, while others go to two-year community colleges. Among those with some college but no bachelor's degree, many began college immediately after completing high school, while others are older workers who return to school for additional training.

Educational Attainment by Race, Ethnicity, and Gender

Women tend to be more educated than men. Women are more likely to have completed high school or obtained a bachelor's degree or higher. In 2004, for example, about 31 percent of 25- to 29-year-old women had a bachelor's degree or higher, compared with 26 percent of their male counterparts (see Table 2-2). This is a fairly recent trend: Until 1991, men in this age group were more likely than women to have a bachelor's degree or higher.

Educational attainment differs widely by race and ethnicity. More than 90 percent of non-Hispanic white and Asian 25- to 29-year-olds have completed high school, compared with 88 percent of blacks and 62 percent of Hispanics in that age group (see Table 2-2). Racial and ethnic differences are even larger for college completion: Among 25- to 29-year-olds, about 61 percent of Asians have a bachelor's degree or higher, compared with 35 percent of non-Hispanic whites, 17 percent of blacks, and 11 percent of Hispanics.

TABLE 2-2.—*Educational Attainment by Race, Ethnicity, and Gender, 2004*

	Share with high school degree or higher	Share with bachelor's degree or higher
Total	87	29
Non-Hispanic white	93	35
Black	88	17
Hispanic	62	11
Asian	96	61
Men	85	26
Women	88	31

Note: Data refer to noninstitutionalized population aged 25–29. Since data exclude incarcerated population, they likely overstate educational attainment of U.S. residents.
Sources: Department of Commerce (Bureau of the Census).

Schooling levels differ between natives and immigrants. In 2004, for example, half of all adult Asian immigrants had completed a bachelor's degree or higher, compared with 28 percent of the overall adult U.S.-born population. Latin American immigrants tend to have lower levels of schooling while their children tend to improve upon the education attained by their parents. According to the National Center for Education Statistics, for example, about 50 percent of Latin American immigrants aged 18–24 had completed high school, while the high-school completion rate was 78 percent among their U.S.-born children of the same age.

Math, Science, and Reading Skills in the United States and Around the World

Educational attainment is an important measure of the preparedness of a nation's workforce, but it does not tell the whole story: Two people with the same level of education may have very different skill levels. Similarly, a high school diploma may not ensure that a student is competent in all areas. The fact that growth in schooling has slowed in the United States might be less worrisome if it were balanced by an improvement among the U.S. population in other measures of skills.

One way in which the United States monitors the academic preparedness and skills of its students is through standardized tests of math, science, and reading. The United States participates in several national and international tests for elementary and high school students. These tests shed light on how the math, science, and reading skills of U.S. students compare to those of students in other countries.

Table 2-3 ranks advanced countries by students' scores on math and science tests at different ages. The countries are ranked by average score, with the highest scorers at the top. Not all countries participate in every test. So that the country rankings can be compared at different ages, only countries that participated in at least half of the tests are included in the table.

As the table shows, older U.S. students do worse relative to other advanced countries than younger U.S. students do. At ages 9 and 13, the United States generally places above the middle of the rankings on math and science tests. By age 15, however, U.S. students are outperformed by most of their international peers. Among students in their last year of secondary school, U.S. students are at or near the bottom of the rankings. Country rankings from international tests in reading, not shown in Table 2-3, are only available at ages 9 and 15. In rankings of advanced countries similar to those shown in Table 2-3 for math and science, U.S. students score above the middle of the rankings in reading at age 9 but fall below the middle by age 15.

TABLE 2-3.—*Rankings of Selected Advanced Countries by Average Score on International Tests*

Age 9		Age 13		Age 15		Last year of secondary school	
Math	Science	Math	Science	Math	Science	Math	Science
Hong Kong Japan Netherlands USA Italy Australia New Zealand Norway	Japan Hong Kong USA Netherlands Australia New Zealand Italy Norway	Hong Kong Japan Netherlands Australia USA Sweden New Zealand Italy Norway	Hong Kong Japan Netherlands USA Australia Sweden New Zealand Norway Italy	Hong Kong Netherlands Japan Canada Australia New Zealand France Sweden Germany Norway USA Italy	Japan Hong Kong Australia Netherlands New Zealand Canada France Sweden Germany USA Italy Norway	Netherlands Sweden Norway France New Zealand Australia Canada Germany Italy USA	Sweden Netherlands Norway Canada New Zealand Australia Germany France USA Italy

Note: The last year of secondary school is 12th grade in the United States but varies in other countries. In countries that track students, students in all tracks were tested in their last year of secondary school; the last year may differ within countries for students on different tracks. Students who dropped out of school before the last year of secondary school were not tested. Data are for 2003 except for last year of secondary school (1995).

Source: Department of Education (National Center for Education Statistics).

The United States has also conducted tests of its 9-, 13-, and 17-year-olds in math and reading going back to the early 1970s. These test results show that elementary school student scores have improved since the early 1970s, especially in math, but the math and reading scores of 17-year-olds are essentially unchanged. This discrepancy means that the United States has failed to translate test-score gains among younger students into higher scores among older students. There is little consensus as to why test scores have not improved more among older students, but understanding the mechanisms would be an important step in raising their educational achievement.

School Accountability and No Child Left Behind

In recent years, as a result of state initiatives and the No Child Left Behind Act, states have implemented plans to enhance school accountability, with the aim of improving student achievement. Under these “strict accountability” plans, schools can be sanctioned (such as through loss of funding or mandatory restructuring) if their students do not meet performance standards. In order for school accountability to work, student achievement must be measured in a quantifiable way that is comparable across students and schools. This measurement is normally done through standardized tests, which are used to quantify school quality in order to identify low-performing schools. These tests allow parents to make meaningful comparisons between schools and make informed decisions about the schools in which to enroll their children.

Rigorous research into the effects of school accountability on student performance is limited, but the results are promising. For instance, a 2004 study found that states implementing school accountability during the 1990s experienced greater increases in students' test scores afterward than states without accountability. This study further found that only strict school accountability led to higher student achievement.

In January 2002, the President signed into law the No Child Left Behind (NCLB) Act, with the purpose of improving the performance of U.S. students. NCLB aims to make schools more accountable for the performance of their students. Under NCLB, each state sets standards for what students in grades 3–8 should know in math and reading. (Science assessments will be added by the 2007–2008 school year.) States must measure students' progress toward those standards through standardized tests. Schools must meet not only an overall annual performance goal but also specific performance goals for subgroups of students, such as racial, ethnic, and income groups. Schools that do not eventually meet performance goals must allow students to transfer to another public school, including charter schools, within the school district and must offer supplemental educational services to students attending schools in need of improvement.

NCLB accountability based on test scores mostly applies to grades 3–8. Testing is now required only once in high school. The President has proposed expanding accountability in high schools by requiring assessments in reading and math for students in grades 9, 10, and 11. Expansion of testing in high schools could help our high school students improve their performance relative to their counterparts in other nations.

Immigrants in the U.S. Workforce

Legal immigrants are a critical part of the U.S. workforce. Although both low- and high-skilled immigrants contribute to the U.S. economy, this chapter focuses on high-skilled immigrants. Chapter 4 of the 2005 *Economic Report of the President* covered immigration in greater depth, with a particular focus on illegal immigrants, who tend to be low-skilled, as well as the fiscal impact of immigration, immigrants and the U.S. labor market, and immigration policy and the enforcement of immigration laws.

Immigrants living in the United States can be divided into four groups: *naturalized American citizens*, immigrants who have become citizens by passing a citizenship test and fulfilling other requirements; *permanent residents*, immigrants who have “green cards” and the legal right to reside permanently in the United States but have not become naturalized citizens; *temporary residents*, people admitted to the United States temporarily for a

specific purpose, including visitors, students, and temporary workers (referred to as *nonimmigrants* by immigration authorities); and illegal immigrants, people residing in the United States illegally. This chapter uses the terms *immigrant* and *foreign-born* according to the Census Bureau's definition: Any person who is in the United States who was not a U.S. citizen at birth, that is, was not born in the United States or of U.S. parents.

Immigrants are prevalent in every education group but are particularly represented among the least-educated workers (those with less than a high school degree) and among the most-educated workers (those with a doctoral or professional degree). As U.S. workers have become more educated and increasingly work in jobs requiring higher education levels, many low-skilled jobs continue to be filled by immigrants. At the same time, high-skilled immigrant workers are a significant part of the skilled U.S. workforce, especially in the science and engineering fields. Many of the nation's university and private research laboratories rely heavily on immigrant graduate students, post-doctoral students, and researchers.

Immigrants in Science and Engineering

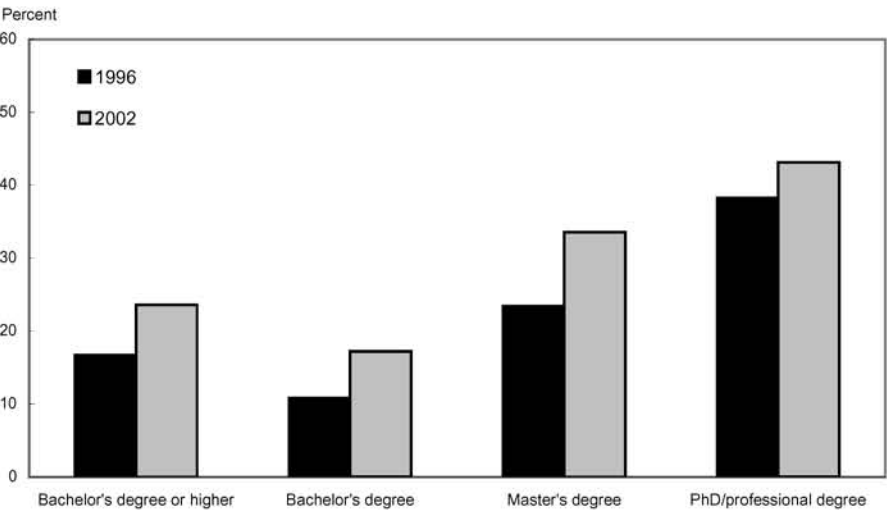
Innovation is crucial to U.S. economic growth and competitiveness, and the United States is a leading innovator. Innovation depends, in part, on scientific research, which in turn requires smart, creative people proficient in science and technology. One way in which the United States is able to maintain its position as a leader in innovation is by attracting the best and the brightest from around the world. Policies that welcome the world's "best and brightest" can contribute to future U.S. competitiveness. More than one-fifth of America's scientists and engineers come from abroad.

Chart 2-2 shows the share of immigrants among scientists and engineers aged 25–44 by education in 1996 and 2002. Immigrants tend to come to the United States as young adults, not as older workers. As the younger, more-recent immigrants age, they should make up a larger share of older workers as well. Thus, restricting Chart 2-2 to workers aged 25–44 provides a glimpse at the future of the U.S. scientific workforce.

Immigrants make up an increasing share of the scientific workforce (see Chart 2-2). In 2002, immigrants made up about 24 percent of scientists and engineers aged 25–44, an increase from 17 percent in 1996. The higher the education level, the larger the share of immigrants: Among scientists and engineers with only a bachelor's degree, 17 percent were immigrants (up from 11 percent in 1996), while among those with doctoral or professional degrees, 43 percent were foreign-born (up from 38 percent in 1996). Immigrants are especially prevalent in the fields of engineering and math/computer science and in the physical/biological sciences. Among those aged 25–44 with professional or doctoral degrees and working in these fields, immigrants made up about half of workers.

Chart 2-2 **Foreign-born Share of Employment by Education among Scientists and Engineers, 1996–2002**

Immigrants are over-represented among scientists and engineers.



Note: Data refer to people aged 25–44 and exclude post-secondary teachers. The ending year for this chart is 2002 because occupational definitions were changed after 2002; the post-2002 occupational categories are not comparable to earlier data.

Source: Department of Labor (Bureau of Labor Statistics).

International Science and Engineering Students

The United States is a top destination for science and engineering students from around the world. In 2003, almost 150,000 students from abroad were enrolled in science and engineering graduate programs at U.S. universities. Nonetheless, new enrollment of such students has been falling. Between 2001 and 2003 (the latest year available), first-time international graduate student enrollment in U.S. science and engineering programs declined by 13 percent. This decline may be the result of increased training opportunities in other countries and visa restrictions for foreign students and scholars put in place in the United States following the September 11, 2001, terrorist attacks.

After completing their studies in the United States, some students return to their countries of origin and others join the U.S. workforce. According to the National Science Foundation, about three-quarters of non-U.S. citizens who obtain science and engineering doctorates from U.S. universities plan to stay in the United States, at least for the short term. In order to remain and work in the United States, these students must get temporary work visas or become permanent residents. This process is described in more detail in the section below.

Regulation of Legal Immigration

The H-1B Program

Temporary work visas allow foreigners to work in the United States for a limited period of time. A commonly used temporary work visa for high-skilled foreigners is the H-1B visa. The visa lasts for three years and is renewable once, for a total stay of up to six years. U.S. employers hiring H-1B workers must attest that they will pay the H-1B workers at least as much as similarly employed U.S. workers and that the working conditions of such workers will not be harmed. In order to hire an H-1B worker, U.S. employers must also pay government fees of \$1,435 to \$2,185, depending on the size of the firm, plus an additional \$1,000 fee for faster processing of the H-1B application. These costs help to ensure that employers are unlikely to hire H-1B workers unless suitable U.S. workers are not available.

Almost all workers with H-1B visas have at least a bachelor's degree, and half have an advanced degree. H-1B visas have been particularly important to the high-tech sector, with over half going to scientists, engineers, and people in computer-related occupations. According to one study of H-1B workers, many such workers do not come to work from abroad but are hired as they graduate from U.S. universities.

The number of high-skilled temporary workers is constrained by the caps on the H-1B program. The number of H-1B visas is capped at 65,000 annually for private companies seeking to hire high-skilled foreign workers, after having been temporarily raised to 195,000 during 2001–2003. Since May 2005, an additional 20,000 visas have been available each year for foreigners who have a U.S.-earned master's degree or higher. H-1B workers are not subject to the cap if they are employed at institutions of higher education, or at nonprofit or governmental research organizations.

Since reverting to 65,000, the H-1B cap has been reached earlier and earlier with each fiscal year. The cap for fiscal year 2004 was reached less than five months into the fiscal year. The cap for fiscal year 2005 was filled on the first day of the fiscal year, and in fiscal year 2006, the cap was reached almost two months before the year even started. That the H-1B cap has been reached so quickly suggests that it is no longer sufficient to meet U.S. demand for high-skilled workers.

Some have proposed to increase the number of high-skilled workers by replacing the current H-1B cap with a market-based cap. A market-based cap would increase or decrease with demand for H-1B workers. If the cap were reached in one year, the cap would be increased by a set percentage—say, 20 percent—the following year. If the cap were not reached in a given year, it

would fall by a similar amount the next year. In this way, the number of H-1B workers would depend on demand for such workers. Any such change would require congressional action.

Employment-Based Green Cards

A temporary visa allows a foreigner to remain in the United States for a specified period of time. To stay permanently requires becoming a permanent resident. In determining who can become a permanent resident, U.S. immigration law prioritizes family- and employment-based immigration. Under family-based immigration, new permanent residents must be sponsored by family members who are themselves U.S. citizens or permanent residents. Under employment-based immigration, most workers must be sponsored by their employer and have at least a bachelor's degree. From 2000-2004, about two-thirds of new permanent residents received their green cards through family-based immigration, about 15% through employment-based immigration, and the remainder through various other programs such as those for refugees.

Caps on employment-based green cards limit the number of high-skilled foreigners who can become permanent residents. The cap is set at 140,000 visas per year, including visas for the workers' spouses and children. Each country's nationals can make up no more than 7 percent of total immigrant visas. These caps have led to long delays for applicants, especially for workers from over-represented countries. For instance, some workers who became eligible in January 2006 for EB-2 employment-based green cards (for workers with advanced degrees or persons of exceptional ability) had applied for permanent residence five years earlier.

A variety of proposals have been advanced for permanent employment-based immigration to allow for more high-skilled workers and to reduce wait times. Any changes to the cap on the number of employment-based green cards would require legislative action. First, workers' spouses and children could be exempted from the cap, as is currently done for the H-1B program. Spouses and children make up about half of the recipients of employment-based green cards, so this change would roughly double the number of workers able to get employment-based green cards. Second, the fixed 140,000 cap could be replaced with a flexible market-based cap that would increase or decrease with demand for workers eligible for employment-based green cards. Finally, under current policy, nationals of no single country can receive more than 7 percent of green cards. This share could be raised to reduce the long delays for employment-based green cards for applicants from countries with large numbers of desirable, high-skilled workers. Careful enforcement of limits on foreign nationals' access to sensitive technology would provide continued protection for our national security.

Skilled Immigration and Innovation

Legal skilled immigrants play an important role in the U.S. economy. They add to the process of scientific discovery, technology development, and innovation, which in turn lead to greater productivity growth. Greater productivity growth improves the standard of living for the U.S. population as a whole.

A recent World Bank study attempted to quantify immigrants' contributions to innovation and the generation of new ideas, as measured by the number of patents applied for or received in a given year. (Patents are a commonly used proxy in studies of innovation.) According to the study, a 10 percent increase in the number of graduate students from abroad, as a share of total graduate students, increases the number of patents granted to U.S.-based universities, firms, and other institutions by about 6–7 percent. Skilled immigrants overall have a smaller but still positive effect: a 10 percent increase in the number of skilled immigrants, as a share of the U.S. labor force, raises the number of patents granted to U.S.-based institutions by about 1 percent. The results of this study may be partly due to a higher concentration of foreign graduate students in the science and engineering fields, as compared to domestic graduate students who are found in a wide variety of fields including humanities and liberal arts.

Skilled immigrants not only contribute to the innovation process themselves, they also help train our own future innovators. The foreign-born make up about one-fifth of science and engineering faculty at U.S. universities, including more than one-third of engineering faculty. As faculty, they teach both undergraduate and graduate students, training the next generation of U.S. scientists and engineers.

U.S. immigration law, by restricting the number of high-skilled immigrants authorized to work and settle in the United States, limits how many foreigners can contribute to the innovation process. Increasing the caps on the H-1B program and on the number of employment-based green cards would allow more high-skilled immigrants into this country. By welcoming more of the best and the brightest from around the world, these changes to the caps would enhance U.S. competitiveness and result in productivity gains for both immigrants and natives, raising the standard of living for the population as a whole.

Job Training

Education and learning do not stop when someone leaves school. Workers need to continually upgrade their skills if they are to adapt to and take part in a continually changing economy. Skills originally learned as a teenager or young adult in high school or college can quickly become outdated. To

remain competitive, workers need to keep their skills relevant, and job training can be a useful way of doing that.

Job training comes in many forms. Often it occurs on the job, either through formal programs run by the employer or through informal learning. Some employers may also send their workers to post-secondary institutions to receive training. Other workers will attend such institutions on their own to keep their skills fresh for their current job, to improve their skills in order to land a better job, or to upgrade their skills after being laid off.

The Role of Community Colleges

Workers often obtain training at community colleges, generally two-year post-secondary institutions that offer certificates and associate's degrees. Community colleges play an important role in providing training to workers, both directly and through employers. Of individuals age 30 and older attending college, about half go to a community college, compared with one-third of students of traditional college age. Some employers may reimburse workers for regular courses taken at community colleges, while other employers may contract with community colleges to offer courses tailored to the employers' needs. Workers may also attend community colleges on their own, especially after a job loss. According to one recent study, about 15–20 percent of long-tenured, laid-off workers complete at least one community college course around the time of their job loss.

Given that so much job training and retraining occur at community colleges, it is important to know whether or not community colleges actually help workers raise their earnings. Recent studies have found that community colleges do contribute to workers' earnings. A year of community college raises real annual earnings by around 6 percent. Community college also helps laid-off workers. According to one study, in the long term, a year of community college raises the earnings of long-tenured, laid-off workers by about 7 percent for men and even more for women, compared to similar workers who do not enroll in community college classes. The earnings gains are higher for workers who take technical, scientific, or health-related courses, and lower for workers who take less quantitative courses.

One of the major sources of financing for community college students is the Pell Grant program, a Federal government program that helps low-income students attend college. In 2005, the Federal government spent about \$7 billion on Pell Grants for students in community colleges. In addition, in 2005, in order to help community colleges provide worker training, the President proposed and Congress approved the creation of Community-based Job Training Grants. The program has continued in 2006 with \$124 million in funding.

Job Training Funding

In 2005, the Federal government spent nearly \$15 billion (excluding Pell Grants) on job training and employment programs. These programs assist many workers in getting the training and other services they need to advance their careers. However, these programs can be strengthened. The \$15 billion in job training money is spread among 9 different government agencies and more than 40 different programs, most with their own rules, eligibility requirements, administrative staff, and overhead costs. Much of this money is not used to support job training programs but instead funds job referral services or job search assistance.

To get more job training dollars into the hands of workers, eliminate unnecessary duplication of services, and improve accountability, the President has proposed consolidating several large job training and employment programs into a single grant that would be used to provide job training vouchers. These vouchers, known as Career Advancement Accounts, would be administered by each state but controlled largely by the worker, who could use the account to pay for education and training. The education and training could take place either at post-secondary institutions or through apprenticeships or other work-based training. These accounts would complement, but not duplicate, Pell Grant resources available to help workers further their career education. States would be required to achieve Federal accountability standards for job placement, employment retention, and earnings. By reducing administrative costs and redirecting more money into job training programs, the Career Advancement Accounts proposal would increase the number of workers who receive the job training they need to upgrade their skills and improve their employment prospects. Career Advancement Accounts would also allow workers the flexibility to choose the training that best suits their needs. They would not tie workers to any particular training provider or location, thus providing workers with maximum flexibility.

Conclusion

Historically, high levels of education and skills in the United States have boosted earnings for individual workers and fueled one of the most dynamic, innovative economies in the world. In recent years, though, educational attainment among young people has, by some measures, leveled off. The rapid growth in schooling in the 1950s and 1960s, and the higher levels of education attained by the younger residents in some of our international competitors, prove that the United States can do better. Promoting a flexible

and skilled labor force—through improved access to high-quality primary, secondary, and post-secondary education, through policies that attract the world’s best and brightest to our shores, and through investment in the continuing education and training of our workforce—will ensure that the United States remains a competitive leader in this rapidly changing world economy.

Saving for Retirement

Over the past few decades, concerns have mounted that Americans have been preparing inadequately for retirement. Recent newspaper headlines suggest that Americans have stopped saving and are at risk of sharp reductions in both their private and public pension benefits. To be sure, these concerns have some basis: The aggregate personal saving rate published in the National Income and Product Accounts (NIPA) turned negative in 2005; high-profile bankruptcies in airlines and other industries have led to substantial reductions in retiree pension benefits; the collapse of technology stocks in the early 2000s left many defined-benefit pension plans underfunded; and promised Social Security benefits vastly exceed forecasted revenues. Understanding how these events relate to retirement security is important if public policy is to respond productively. This chapter builds such an understanding. The main points are:

- Most working-age Americans are on track to have more retirement wealth than most current retirees. However, it is inherently difficult to assess whether these preparations are *adequate* for most households, given that incomes have also grown over time and people may have markedly different plans for their retirement length and standard of living.
- The decline in an often-cited aggregate personal saving rate may not be cause for alarm. Much of this decline can be attributed to spending triggered by wealth increases from capital gains on housing and financial assets.
- There are, however, a number of risks to the retirement preparations of Americans: People today are living longer and could face higher health-care costs in retirement than members of previous generations. In addition, Social Security and many defined-benefit pension plans are at risk.
- Both defined-benefit pensions and Social Security suffer from fundamental financial problems, which expose not just retirees but all U.S. taxpayers to risk of substantial losses. The Administration is focused on addressing these problems and protecting the Nation's retirement security.

What Does “Retirement Preparedness” Mean?

Retirement preparedness is defined here as the accumulation of wealth necessary to maintain a desired standard of living in retirement. Economists tend to agree that individuals want to *smooth consumption* in retirement (i.e., limit the extent to which retirement will decrease their consumption). However, individuals may have disparate views about how much they want to

smooth consumption, when they plan to retire, and how much they intend to work in retirement. Thus, two individuals, even with the same preretirement standard of living, may have markedly different views about how much wealth accumulation is adequate.

For the purposes of this discussion, we divide the wealth that individuals can draw on in retirement into three categories: personal net worth, including defined-contribution pension plans; employer-sponsored defined-benefit pensions; and Social Security. (Retirement wealth also includes other expected benefits, such as retiree health care from employers and Federal programs, but such benefits fall outside the scope of this chapter.) Personal net worth is the sum of the value of financial assets (e.g., stocks and bonds held in and out of retirement accounts such as 401(k) plans, and savings accounts) and durable goods (e.g., houses and cars) less the value of liabilities (e.g., credit card debt, mortgages, and car loans). Net worth grows in part from personal saving—the excess of after-tax income over consumption—and in part from inheritances and capital gains on assets already owned. Some portion of current workers' net worth, however, may be drawn down before retirement. For instance, households may liquidate financial assets or take out home-equity loans to make tuition payments, pay health-care expenses, or offset negative income shocks.

The other two sources of retirement wealth, employer-sponsored defined-benefit pensions and Social Security, are sometimes referred to as retirement income, since payments from both sources are periodic. Employer-sponsored defined-benefit pensions generally increase with years of employment and salary levels, while Social Security payouts tend to increase with retirement age and average lifetime earnings.

The next section of this chapter considers how prepared households are for retirement. Because the definition of retirement adequacy is somewhat subjective, we focus primarily on cross-generational comparisons of retirement-wealth accumulation. Cross-generational comparisons do not speak directly to the adequacy of retirement preparations, but do shed light on the related question of whether retirement preparations have deteriorated.

Estimates of Retirement Preparedness

This section begins with a brief description of the results from studies that directly address the difficult question of whether retirement preparations are adequate. The section then discusses cross-generational comparisons, beginning with comparisons of net worth and ratios of net worth to income, and then turning to comparisons of retirement income from defined-benefit pensions and Social Security. The section concludes with a discussion of the key limitations of cross-generational approaches.

Studies that directly address the question of retirement adequacy typically define adequate wealth accumulation as essentially that which is expected to smooth consumption according to a particular model of individual preferences. Given that these studies make different key modeling assumptions, and in some cases include different components of expected retirement wealth, they have generated a wide range of results. Nevertheless, some recent studies find that most baby-boom households have been preparing adequately. In any case, conclusions about retirement adequacy based on these studies should be regarded as suggestive only, given the inherent uncertainty surrounding predictions of how much wealth is enough.

Comparing retirement wealth across generations, unlike evaluating the adequacy of any one generation's preparations, can be done without reliance on subjective assumptions. One such cross-generational study of retirement wealth contrasts the net worth (defined as above) of households in the baby-boom generation (individuals born between 1946 and 1964) and generation X (headed by individuals born between 1965 and 1976) with that of households in the pre-baby boom generation (headed by individuals born between 1925 and 1945). The study considers the net worth of the heads of these households when they were between 25 and 34 years old. Controlling for age is essential given that individuals tend to save at different rates over their lifetimes.

The study finds that baby-boom and generation-X households tend to have more net worth than pre-baby-boom households had when they were roughly the same age. As shown in Table 3-1, the median net worth of pre-baby-boom households at ages 25-34 was \$6,072 in 1998 dollars. In contrast, the median net worth of baby-boom and generation-X households was, respectively, \$19,504 and \$15,500 in 1998 dollars. The somewhat lower median net worth of generation-X households mainly reflects their higher debt burdens. The table also reveals that baby-boom and generation-X households with heads of all types—low or high education, married or single—were better off than pre-baby-boom households.

We might also want to compare household net worth to income for each generation to see whether saving rates have kept pace with increases in income. Intuitively, households with greater wealth-to-income ratios will be better able to maintain preretirement living standards when they retire. As shown in Table 3-2, the same study also finds that median net worth-to-income ratios are higher for the baby-boom and generation-X households than for the pre-baby-boom households, and these gains were experienced by a wide range of demographic groups.

Finally, we can compare the median expected retirement income of baby-boom households with that of generation-X households. The study finds that median expected retirement income (including predicted defined-benefit pension and Social Security payouts in inflation-adjusted dollars but not personal net worth) for generation-X households is greater than that for

TABLE 3-1.— *The Median Value (in 1998 dollars) of Net Worth
for Households Headed by a 25- to 34-Year Old—
Differences by Homeownership, Marital Status, and Education*

	Median		
	Pre-Baby Boom	Baby Boom	Generation X
Homeowners	\$25,594	\$60,521	\$43,100
Nonhomeowners.....	982	4,699	3,300
Less than high school	815	4,658	2,500
High school graduate	10,044	17,195	17,920
College graduate	23,953	36,569	30,020
Married	9,165	31,677	34,501
Not married.....	0	7,160	5,750
All households.....	\$6,072	\$19,504	\$15,500

Note: Government Accountability Office analysis based on data from the Survey of Consumer Finance. Households between the ages of 25 and 34 in 1962, 1983, and 1998 belong, respectively, to the “Pre-Baby Boom,” “Baby Boom,” and “Generation X.”

Net worth is equal to assets minus liabilities. Assets include IRAs, 401(k)s, 403(b)s, and other thrift-type plans, as well as savings accounts, mutual funds, stocks, bonds, and durable goods. Liabilities are from credit card debt, installment loans, and housing debt.

Source: Federal Reserve Board.

TABLE 3-2.— *Median Value of Wealth-to-Income Ratios
for Households Headed by a 25- to 34-Year Old—
Differences by Homeownership, Marital Status, and Education*

	Median		
	Pre-Baby Boom	Baby Boom	Generation X
Homeowners	0.641	1.343	1.044
Nonhomeowners	0.052	0.167	0.151
Less than high school	0.029	0.216	0.159
High school graduate	0.278	0.525	0.586
College graduate	0.510	0.799	0.743
Married	0.261	0.755	0.742
Not married	0.000	0.299	0.268
All households	0.214	0.562	0.523

Note: Government Accountability Office analysis based on data from the Survey of Consumer Finances. Households between the ages of 25 and 34 in 1962, 1983, and 1998 belong, respectively, to the “Pre-Baby Boom,” “Baby Boom,” and “Generation X.”

Net worth is equal to assets minus liabilities. Assets include IRAs, 401(k)s, 403(b)s, and other thrift-type plans, as well as savings accounts, mutual funds, stocks, bonds, and durable goods. Liabilities are from credit card debt, installment loans, and housing debt.

Source: Federal Reserve Board.

baby-boom households. A second, less sanguine, result is that if the Social Security system's expected funding shortfalls are resolved by gradually reducing retirement benefits (notably, not the Administration's proposed solution) and thus lowering benefits for generation X more than for the baby boomers, then the median expected retirement incomes of generation-X and baby-boom households are about the same. This implies that, in terms of retirement income relative to preretirement income, generation-X households have not kept pace with the baby boomers.

The results shown above have a few important limitations. First, cross-generational comparisons fail to adjust for the possibility that current generations may live longer and could face higher health-care costs in retirement than previous generations. As a result, current workers may need more retirement wealth than previous generations. On the other hand, longer life expectancies may encourage current generations to work longer than previous generations, which, all else equal, would lower retirement-wealth needs.

Another limitation of these cross-generational comparisons is that they consider only a relatively early period in each generation's lifecycle (although they allow the inclusion of more recent generations). However, studies that compare somewhat older households from the baby-boom generation to recent retirees find similar conclusions. Nevertheless, retirement preparations of today's Americans may veer off track as they age if they stop saving or if financial-asset returns, house-price gains, or defined-benefit pension and Social Security payouts turn out to be less than expected. The next section of this chapter addresses some of the key risks to retirement preparations.

The Risks to Retirement Preparedness

Three risks to retirement wealth are discussed in this section: first, the risk to household net worth created by the negative level of the personal saving rate, as measured in the National Income and Product Accounts (NIPA); second, the risk to defined-benefit pension plans created by underfunding, in part due to investments in risky assets; third, the risk to Social Security from the aging of the population and other structural problems.

Are Low Saving Rates Putting Household Net Worth at Risk?

The NIPA personal saving rate is the difference between the *household sector's* after-tax personal income (*disposable income*) and personal consumption, expressed as a percentage of disposable income. As a technical matter,

the household sector includes nonprofit institutions. The NIPA personal saving rate was constructed as a measure of the household sector’s contribution to *national saving*—funds set aside from the economy’s current production to finance investment (see Chapter 1, entitled The Year in Review and the Years Ahead, and Chapter 6, entitled The U.S. Capital Account Surplus, for more discussion of the national saving rate). However, the NIPA personal saving rate is widely cited in newspapers as a gauge of retirement preparedness. The discussion here details the NIPA saving rate’s limitations as a measure of the extent to which households are adding to their retirement wealth. The goal of the discussion is to assess whether the decline in the NIPA personal saving rate reflects a widespread deterioration in household retirement preparations.

Chart 3-1 illustrates the decline in the NIPA personal saving rate. The saving rate is volatile from quarter to quarter but has been trending down at a relatively constant rate of about 0.5 percent per year since the early 1980s. In the fourth quarter of 2005 (the most recent quarter for which data are available), the NIPA personal saving rate was -0.4 percent, not far above the post-World War II low observed in the third quarter.

Chart 3-1 Personal Saving as a Percentage of Disposable Personal Income
The saving rate has declined from 10 percent to a bit below zero over the past 25 years.
Personal saving, percent of disposable personal income (seasonally adjusted)



However, the relationship between the personal saving rate and households' wealth accumulation is not always close. Household net worth is what matters for retirement, but the NIPA personal saving rate is not equal to the change in household net worth. First, the NIPA personal saving rate excludes the acquisition of consumer durables, a component of household net worth. Second, while business saving (such as businesses' retained profits) is ultimately owned by households, it is also excluded from NIPA personal saving. Third, and arguably most important, the NIPA personal saving rate excludes capital gains on financial and other assets (e.g., the increase in the value of a house); however, taxes on capital gains, which reduce the saving rate, are included in the computation of personal saving. The exclusion of capital gains is particularly problematic because capital gains may encourage households to consume more, which in turn drives down the measured saving rate. In other words, capital gains may be reflected in the data as reductions in saving, even though these gains add to household wealth on net—though some might argue that these gains can be illusory.

Do Wealth Gains Explain the Decline in the NIPA Personal Saving Rate?

The *consumption-wealth effect* (i.e., the tendency to consume more as wealth increases) has been the subject of numerous empirical investigations. Studies find that an additional dollar of wealth tends to lead to a permanent rise in the level of household consumption of about 2 to 5 cents. The link between aggregate wealth and spending has proved to be one of the more enduring relationships in macroeconomics.

Estimates of the consumption-wealth effect suggest that it can explain a sizable portion of the decline in personal saving since the mid-1990s. As shown in Chart 3-2, the ratio of household net worth to disposable income has risen from about 440 percent in the early 1980s to about 550 percent in the third quarter of 2005. This measure of household net worth, obtained from the Federal Reserve's Flow of Funds Accounts, is the difference between household assets—including defined-benefit pension wealth—and household liabilities. The ratio moved up and down with the rise and collapse of the stock market in the late 1990s and early 2000s and then rebounded more recently along with rising house prices and stock market gains. An estimate of the impact of these wealth gains on the NIPA personal saving rate is shown below in Chart 3-3. Under the assumption that an additional dollar of wealth leads to a \$0.035 permanent rise in the level of consumption (the middle of the range cited above), the chart shows that the personal saving rate would have declined about half as much since 1980 if household wealth had grown at the same pace as disposable income (keeping the ratio constant) over that period.

Chart 3-2 Household Net Worth as a Percentage of Disposable Income
 Since the mid-1990s, net worth has increased on balance relative to disposable income.

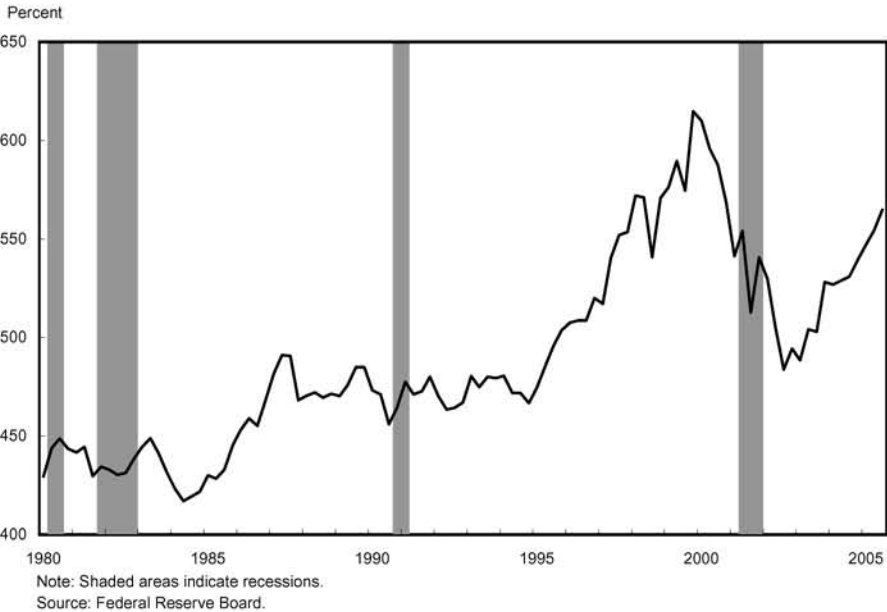
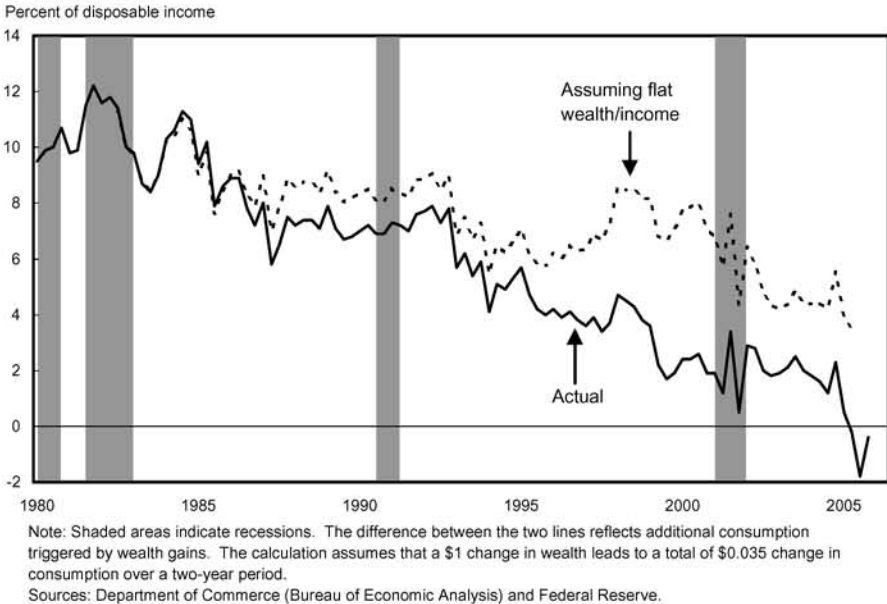


Chart 3-3 Household Saving Rate as a Percentage of Disposable Income
 If wealth only grew as much as disposable income since 1994, the saving rate would have declined substantially less.



Are Saving Rate Declines Widespread?

Yet another limitation of the NIPA personal saving rate as a measure of households' wealth accumulation is its aggregate nature; as such, it masks possible differences in behavior by households at different income levels. Understanding the saving dynamics in different parts of the income distribution requires household-level data on saving.

However, household wealth at the individual level is difficult to track over time. One study thus employed an innovative approach to circumvent various data problems and found that the saving rate, using NIPA definitions, for households in the upper two-fifths of the income distribution declined over the 1990s, while the saving rate for households in the middle fifth remained relatively steady, and the saving rate for households in the bottom two-fifths actually increased. Given that high-income households almost certainly experienced the majority of capital gains in the 1990s, these results suggest that the net worth component of retirement wealth may not be at risk. Relatively high-income households may have accumulated net worth from capital gains, while other households may have accumulated net worth by saving.

Overall, the above discussion of household saving suggests that the net worth component of retirement preparedness may not be in jeopardy. The NIPA personal saving rate is a potentially misleading measure of households' wealth accumulation. Moreover, much of the recent decline in the NIPA personal saving rate may reflect consumption increases that were triggered by capital gains on stocks and real estate. Finally, some evidence suggests that the decline in household saving rates has not been widespread but may have been concentrated among higher-income households.

Policy Reforms

While the net worth component of retirement wealth does not appear to be in jeopardy, policy reforms can still productively reduce impediments to saving. Under current law, interest income is taxed, creating a disincentive for households to set aside funds for retirement. This disincentive is mitigated to some extent by policies that afford favorable tax treatment to various types of retirement accounts (e.g., IRA and 401(k)). However, restrictions on these accounts limit their value as retirement-saving vehicles. To make these accounts more effective, Congress passed legislation that increases contribution limits and makes retirement assets more portable. In addition, the Administration has proposed simplifying the retirement account system in two important ways: (1) creating a single Retirement Savings Account (RSA) to replace the three types of Investment Retirement Accounts (IRAs) currently in place; and (2) creating a Lifetime Savings Account (LSA) that could be used for a variety of purposes, including retirement saving (see Chapter 5, entitled *The U.S. Tax System in International Perspective*, for

additional discussion of tax recommendations in the President's Budget). Another impediment to saving may be limited financial knowledge. The Department of the Treasury is actively engaged in campaigns to improve financial literacy. In addition, the President has instructed the Federal Deposit Insurance Corporation (FDIC), the Small Business Administration (SBA), and the Treasury Department to work with consumer groups to ensure that financial literacy is widespread.

Defined-Benefit Pensions

Historically, *defined-benefit* pension plans have been an important part of retirement preparedness. These employer-sponsored plans compensate retirees through a specified monthly benefit, which tends to vary with salary and years of service. In addition, most plans sponsored by private employers are guaranteed in part by the Pension Benefit Guaranty Corporation, and those sponsored by public employers are ultimately backed by the ability of states to levy taxes. As such, "DB" plans may appear more stable than increasingly prevalent "defined-contribution" plans (such as 401(k) plans), which explicitly depend on employee contributions, tie benefits more directly to market performance, and may expose retirees to longevity risk (the risk of outliving retirement resources).

Defined-benefit plans can, nevertheless, carry considerable risk. This risk comes from employers (1) contributing less to plans than what is promised to employees (*funding risk*), (2) investing contributions in a hazardous manner (*portfolio risk*), and (3) encountering financial distress (*bankruptcy risk*) in the case of private employers. When these risks are realized, beneficiaries and taxpayers can be exposed to substantial and oftentimes unanticipated losses.

An early example of these problems comes from the 1960s landmark case of Studebaker Corporation. When this former carmaker defaulted on its defined-benefit plan, it left about 11,000 participants without most or any of their pensions. These losses eventually led Congress to set minimum standards for private pension plans via the Employee Retirement Income Security Act (ERISA) in 1974.

ERISA gave rise to the Pension Benefit Guaranty Corporation (PBGC), which now partially insures the pensions of over 34 million workers and retirees. The PBGC largely funds itself with premiums from private-sector sponsors of defined-benefit plans (i.e., employers). When an employer becomes financially distressed, the PBGC may take control of the plan's management and use the plan's assets and its own funds to pay retirees a capped portion of their promised benefits. Employees in contemporary cases like the bankruptcy of United Airlines filed in 2002 are thus less exposed to defined-benefit risks than were employees in cases like Studebaker.

Despite this insulation, employees with defined-benefit pension plans sponsored by private employers remain exposed to considerable risks. As of 2005, for example, the limit on PBGC insurance increased with retirement age, and topped out at about \$46,000 per year. Employees whose plans default can thus incur considerable losses when their promised benefits exceed these limits. United's workers, for example, expect to receive about 80 percent of their earned benefits, and thus stand to lose more than \$3 billion of total promised benefits. In addition, as the following sections show, the combination of inadequate protections and a series of pension defaults has left the PBGC with insufficient funds for paying even these limited claims. Consequently, if losses overwhelm the pension insurance system, Congress may step in and pass the bill to taxpayers.

For defined-benefit plans sponsored by public employers, the taxpayer exposure is even more direct. Recall that the PBGC only insures plans sponsored by private employers. In the event that a publicly sponsored plan's assets are insufficient to pay benefits, absent renegotiation of benefits, such plans could only be made whole with the support of state-level tax revenues.

Employee Exposure to Defined-Benefit Risks

Recently, market fluctuations and the rules that govern how employers participate in the defined-benefit system appear to have turned risks into reality. Decreasing interest rates and stock market valuations, coupled with the exposure of pension plan assets to market fluctuations, coincided with a marked increase in the underfunding of defined-benefit plans. Underfunding, in turn, increased expected defaults on pension obligations, putting both workers and the pension insurance program into jeopardy.

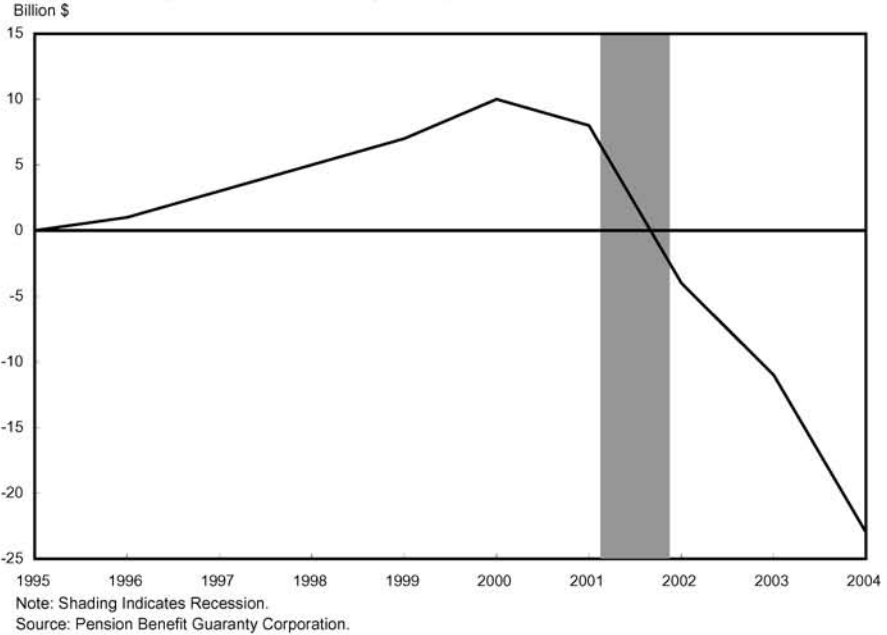
In the case of privately sponsored pensions, the value of assets set aside to fund retirement obligations began to decrease in 2000 while the value of promised benefits began to increase. The total underfunding of private pension plans grew from less than \$50 billion at the end of 2000 to over \$400 billion today. At the same time, as Chart 3-4 illustrates, PBGC's capacity to insulate workers from employer defaults turned from a \$10 billion surplus in 2000 into a deficit that now totals more than \$20 billion.

This deterioration can plausibly be attributed to the exposure of pension plan portfolios to coincident decreases in both interest rates and stock market valuations. A decrease in interest rates can contribute to this problem by increasing the measured *present value* of a pension plan's promised benefits. A decrease in stock market valuations can further contribute by weakening the ability of plan investments to pay benefits.

To see this relationship, suppose that an individual wants to buy a new appliance next year for \$500, and consider how much must be saved today to

Chart 3-4 **Funding Status of the Pension Benefit Guaranty Corporation**

The PBGC's funding status has worsened significantly since 2000.



fund this purchase. The answer depends on how much interest these savings will earn: As this interest increases, the savings that are necessary to fund the future purchase decrease. Extreme cases are illustrative: One would have to save \$500 today if the interest rate is 0 percent, but only \$250 if it is 100 percent. This example reflects a more general relationship: When interest rates decrease, the present value of future obligations increases.

For pensions, this relationship implies that employers must set aside more funds to meet pension obligations when interest rates decrease. The decrease in interest rates that started late in 2000 thus threatened the funding status of defined-benefit pension plans.

A simultaneous decrease in stock market valuations from the peaks of the late 1990s appears to have furthered this threat. At the same time that interest-rate changes were increasing the value of employers' obligations, a decrease in stock market valuations was diminishing the value of assets that employers had set aside to fund those obligations. Together, these changes coincided with the marked weakening in the funding status of both defined-benefit plans and the PBGC.

While market fluctuations appear to have been an important contributor to these woes, they could be made less so. To see why, recall from above that the PBGC manages the pension plans it receives from financially distressed employers. In doing so, it reduces exposure to interest-rate fluctuations by matching investment payoffs with the timing of employee benefits. The value of plan assets and liabilities will tend to move more closely together under this strategy of duration matching than they would under the strategies that employers appear to have used.

Taxpayer Exposure to PBGC's Deficit

The recent spike in underfunding has also exposed taxpayers to the prospect of making up for the PBGC's deficit (recall that this exposure is more immediate for publicly sponsored plans). While the PBGC's liabilities are not explicitly backed by the Federal government, a future Congress might decide that a taxpayer bailout is preferable to a PBGC default. Indeed, taxpayers' exposure to the PBGC's deficit is especially concerning since the manner in which it evolved mimics how the 1980s savings and loan (S&L) crisis developed.

Like the insurance that PBGC offers, the insurance offered to depositors at financial institutions can provide important benefits. But if they are not prudently managed, these insurance programs can fall prey to moral hazard (explained in Chapter 9, The U.S. Financial Sector) and thus expose taxpayers to an undue liability. In the 1980s, for example, loose regulatory oversight let savings and loans overly expose themselves to market fluctuations (such as changes in real-estate values and interest-rates) and ultimately left insufficient funds for paying off depositors. Depositors did not fully bear the burden of this underfunding, however. Instead, the Federal Savings and Loan Insurance Corporation (FSLIC) insured depositors in much the same way that PBGC covers retirees.

In an analogous manner to the current pension situation, market fluctuations and regulatory difficulties not only helped increase the rate at which depositors drew on this insurance, they also compromised FSLIC's capacity to pay insurance claims. Like the PBGC, FSLIC was structured to be self-financing. Nevertheless, taxpayers ultimately paid about \$150 billion for the financial losses of failed institutions.

The PBGC faces a situation that is similar to what plagued FSLIC. Waiting to implement productive reforms magnified taxpayers' burden in bailing out the S&L industry. Postponing the issue of underfunded pension plans can likewise make matters worse for pensioners and taxpayers. According to testimony by the PBGC's executive director, the PBGC's present \$23 billion deficit could grow toward \$80 billion over the next ten years. Without prompt and effective action, taxpayers may thus find themselves bailing out yet another "self-financed" public insurance program.

Policy Reforms

Prompt action, grounded in good economics and informed by lessons learned from similar financial crises, can keep the current pension problem from becoming even more burdensome. To help the private pension system move in this direction, the administration has proposed to strengthen the requirements for funding privately sponsored pension plans and improve the manner in which plan sponsors disclose information. State-level policies that would address the problems with plans sponsored by public employers are at an earlier stage of development.

Current funding and disclosure rules can allow privately sponsored pension plans to appear healthier than they actually are. Reforms such as restricting the use of “credit balances” could help enhance funding adequacy and transparency. Under present law, employers receive credit for contributions that exceed minimum requirements and can later use those credits in lieu of actual contributions. This treatment is problematic. For example, excess contributions are characterized as earning interest even if the assets in which those contributions were invested lose value. Moreover, credit balances can delay plan sponsors from addressing funding problems and thus let even grossly underfunded employers forgo actual contributions.

Limiting private employers’ ability to use an average interest rate to value plan liabilities could also strengthen funding and improve transparency. Recall that, as interest rates decrease, the present value of an employer’s pension obligations increases. Current law lets employers use a moving average of these rates spread out over several years, however, and thus mutes the near-term effect of an interest-rate decrease on an employer’s contribution requirements.

To see this effect, suppose that employers can use a two-year average, and that interest rates decrease from 6 percent to 5 percent. Using an average rate, employers could discount their future obligations at 5.5 percent. But if employers had to use the current rate of 5 percent, they would have to increase contributions by more, and do so more quickly. Averaging the discount rate can thus cloud the picture of a plan’s status.

The Administration has similarly proposed limits on the ability of private employers to smooth reported fluctuations in the value of their plan-assets. Coupled with the related proposal for plans to accurately address the timing of benefit payments, this reform could reduce the portfolio risks that are characterized above as the proximate cause of the system’s weakened funding status.

Finally, the administration has proposed to increase funding targets, measure the performance of plans in a uniform manner, and update assumptions like those of mortality. These reforms, like the others discussed above, would enhance the integrity of the defined-benefit system, and should be uniformly applied across plan sponsors. Doing otherwise would give some

economic sectors, or firms within a sector, an artificial advantage. Economic performance could deteriorate as scarce resources flow not to their most productive uses, but to their most politically-favored uses. In addition, exempting certain sectors or firms could exacerbate the underfunding problem by breathing artificial life into risky plans and thus further exposing workers, retirees, and taxpayers to economic risk.

Social Security

Along with personal savings and employer-provided pension plans, Social Security has long stood as a pillar of retirement security. A response of Franklin D. Roosevelt's administration to the Great Depression, the Social Security Act was signed into law on August 14, 1935, and first issued monthly retirement checks in January 1940. At that time, about 200,000 retirees received aggregate benefits valued at about \$35 million. Since then, both the number of beneficiaries and the level of benefits has steadily grown. In 2004, more than 47 million beneficiaries received a total of about \$493 billion through the Old Age, Survivor, and Disability Insurance programs (OASDI).

These benefits are funded by taxes on wage income. In an accounting sense, employers and employees equally share this funding by contributing 6.2 percent of taxable payroll each. Since employers focus on the total cost of labor, however, workers bear most of this combined 12.4 percent tax. For each worker, this tax applies to payroll beneath a ceiling that annually adjusts with the average wage index. That ceiling, which stood at \$90,000 in 2005, increased to \$94,200 for 2006.

Taxpayer Exposure to an Increasingly Large Social Security Burden

The overall cost of Social Security is substantial. The Office of Management and Budget (OMB) estimates that Social Security transfers amounted to 4.2 percent of GDP in 2005. During the coming decades, Social Security's share of GDP is expected to increase, reaching 6 percent in 2035.

In the short term, this increase will largely come from the retirement of baby boomers, which begins in 2008. It will persist in the long run, however, due to a combination of relatively low fertility rates and relatively high life expectancies. These factors will push the ratio of workers to retirees down from its current level of 3.3 to 1 to around 2 to 1 by the time that most baby boomers retire.

Since the benefits of those currently retired mostly come from taxes on those currently working, these developments will create considerable pressure to increase payroll taxes. Indeed, the Social Security Administration's actuaries estimate that, starting in 2017, the system's annual cost will exceed its total tax income (which includes taxes on payroll and Social Security benefits themselves).

From an accounting perspective, Social Security can still fully fund benefits at this point because the system has run surpluses since 1984, holding special Treasury bonds as IOUs. Although they are assets to the Trust Fund, however, these IOUs are equally debt to the Federal government, and thus an obligation that faces taxpayers.

The actuaries estimate that without legislative action, the Trust Fund's IOUs will run out by 2041, leaving a system that can fulfill only 74 percent of currently scheduled benefits. Even more, promised Social Security benefits from 2005 to 2080 are expected to exceed the sum of revenues and Trust Fund IOUs by \$4 trillion in present value. Given these mounting costs, taxpayers and workers would be better off dealing with this problem now rather than later.

Social Security reform has been on the national radar for decades (see Box 3-1). Notably, former President Clinton convened an Advisory Council which, in 1996, released several recommendations. Two of the three plans supported by the Advisory Council involved some kind of voluntary personal retirement accounts (through publicly held individual accounts in one case and privately administered personal accounts in another), and the other plan also envisioned moving to a system of advance funding, albeit through government-directed investment in equities. Importantly, the longer it takes to initiate reforms, the greater any changes must be, because they will be shared by fewer generations.

Policy Reform: Progressive Indexing

Projections suggest that, under current law, the Social Security system will soon be unable to pay for itself. Many of the proposals to address this problem fall short of a productive and durable reform. Removing the cap on wages that are subject to the payroll tax, for example, would not only increase contributions to the system but also increase the system's promised benefits in the long term. Progressively reducing future benefit growth, on the other hand, may strike an attractive balance by closing roughly two-thirds of the system's long-range annual cash shortfalls while maintaining the system's capacity to act as a social safety net.

Initial benefits for new retirees are currently indexed to wage inflation rather than price inflation. Since wages typically increase at a faster rate than prices (reflecting gains in productivity), wage indexation results in increasingly large benefits in real dollar terms. Progressive indexing would decrease the rate of benefit growth for individuals whose lifetime earnings are the highest (less than the highest 1 percent of all wage earners) by linking their benefit growth to price increases. At the same time, it would maintain the current law's more generous benefit-growth rate for individuals whose lifetime earnings are relatively low. Benefits of retirees in the upper 70 percent of the

Box 3-1: Earlier Attempts to Shore Up Social Security

Congress has responded to developing problems with Social Security finances in the past. For example, both 1977 and 1983 saw the signing of significant amendments to improve the system's deteriorating financial condition.

Why were the system's finances deteriorating then, and why are they continuing to do so today? There are several answers. First, the 1972 amendments to Social Security effectively indexed benefit growth for those working at the time to both wage and price inflation, essentially providing two cost-of-living adjustments. This double-benefit indexation was amended in 1977 to establish the current method of wage indexation. But while wage indexation addressed the double-indexation issue, some experts warned that, coupled with demographic changes, it would still require future taxpayers to shoulder larger Social Security tax burdens than is required today.

Second, the economic projections following the amendments of 1972, 1977, and 1983 proved overly optimistic. From 1972 to 1976, for example, real wages grew by nearly 11 percent less than expected, resulting in lower than anticipated growth of the payroll income base on which Social Security taxes were collected. Similarly, from 1977 to 1981, real wages decreased by about 6.9 percent rather than increasing by 12.9 percent as projected. Assumptions made following the 1983 reforms were not as far off as those of 1972 and 1977, but are nonetheless responsible for some of the overstatement of Social Security's financial strength. Consequently, although the year for the exhaustion of the Trust Fund was forecast to be 2063 in 1983, it has been pushed forward and now stands at 2041.

Third, and perhaps most importantly, the 1983 reforms did not attain sustainable solvency. The 1983 reforms envisioned several decades of Social Security surpluses, followed by several decades of large and growing deficits. This meant that with the passage of time, Social Security would again become financially imbalanced. Even as early as the 1985 Social Security Trustees' report, it could be seen that the system was again heading out of long-term balance. This is one reason why a number of bipartisan commissions have since recommended that future Social Security reforms place the program on a sustainable, as opposed to merely a solvent, footing.

distribution would depend on a combination of price and wage increases. The system would be progressive because benefit growth would slow the most for those with higher earnings. This method of benefit growth would let future retirees enjoy benefits that are higher than those paid today while eventually ensuring that no person who works a full career would retire with a Social Security benefit below the poverty level.

Progressive indexing would slow the benefit-growth rate for high-income individuals in a manner that strongly pushes the system toward solvency. In addition, by maintaining a relatively fast rate of benefit growth for low-income individuals, progressive indexing would further protect retirement incomes from falling below the poverty level.

Policy Reform: Personal Accounts

The traditional Social Security system largely funds retirement benefits by transferring payroll taxes from current workers to beneficiaries. In addition to being subject to the risk of insolvency (which, as explained above, can be addressed in part through progressive indexing), this type of *pay-as-you-go* system runs the risk of future workers voting to cut back on their contributions. This risk may be considerable, as additional changes needed to restore solvency would leave future retirees with substantially smaller benefits than the current system's promises.

This problem comes in large part from a system that relies on future generations to fulfill promises made today. By letting individuals pre-fund their retirements, personal accounts allow current generations to rely in part on their own savings, rather than solely upon contributions that future generations may be unwilling or unable to make.

Because this issue is separate from that of solvency, personal accounts need not (and under the President's proposals, would not) adversely affect the system's long-term finances. If traditional benefits are offset by the amount that individuals could obtain by investing in low-risk assets, such a reform can be made approximately neutral with respect to the capacity to fulfill remaining traditional benefits. Such offsets are said to be roughly neutral on an actuarial basis because they leave (1) beneficiaries who remain wholly invested in government bonds with the same expected future benefit and (2) the Trust Fund with nearly the same expected long-term balance.

While they leave the long-term balance mostly unchanged, allocations to personal accounts do alter the timing of the system's future obligations. Their basic effect is to take some of the long-term obligation and shift it to an earlier time. Moving a portion of payroll taxes to personal accounts will take money off of the government ledger today, some of which is used to pay for current benefits and some of which has long been used to finance other Federal

spending. At the same time, because voluntary personal retirement accounts will replace a portion of unfunded future benefits, they also reduce future strains on the system.

Shifting the future imbalance forward in time could increase transparency by making the system's impending shortfalls less of an abstraction. Financial markets tend to applaud such solutions to fiscal challenges and might do so again in this context by keeping interest rates at productive levels.

Pre-funding a portion of future benefits appears attractive in other dimensions as well. Every dollar of benefits funded today through personal accounts is a dollar of benefits that need not be paid by taxpayers in the future. Because rising benefit obligations would under current law lead to increased tax burdens over time, shifting forward the funding of some benefits could create a more equitable treatment of different generations.

In addition, redirecting assets to personal accounts increases the likelihood that real savings will be accumulated to meet tomorrow's retirement needs. If these assets are owned and controlled by individuals, they will be less available for the government to spend than if these assets are left on the Federal ledger. Finally, personal accounts would provide an opportunity for individuals to diversify their investment in Social Security, which may add to their retirement security.

Conclusion

This chapter's first section shows that today's generations are on track to have more retirement wealth than previous generations, though it is unclear whether these wealth gains have kept pace with rising preretirement incomes. Going forward, the relative security of retirement wealth may be compromised by fundamental problems with defined-benefit pensions and Social Security.

Both of these systems could be improved by more-effective funding rules and safeguards that protect against the opportunistic handling of retirement assets. Strengthening pension-contribution requirements, and watching more carefully how those contributions are managed, would go far to mitigate the growing risks to pensioners and taxpayers alike. Progressively targeting the rate of future benefit growth and expanding ownership over payroll contributions, likewise, would help strengthen Social Security for the future. In both cases, waiting to act allows the present problems to grow and increases the costs of adopting effective reforms.

Improving Incentives in Health Care Spending

Health care spending in the United States has increased rapidly over the past several decades, rising 44 percent in real per capita terms in the past ten years alone. Some of the reasons for this marked rise reflect higher-quality health care, such as improved technological options for enhancing the health and quality of life of the American people. However, other factors, such as poorly functioning markets for health care, may have led to excessive spending and inefficient patterns of medical care utilization. Furthermore, whether this increased spending is of high value or not, it has put tremendous pressures on individuals and the institutions that finance health care spending. Family budgets are being strained as health care costs take up an increasing share of incomes. Government health care expenditures have also been increasing rapidly, burdening both Federal and state budgets. If not curtailed, the increased costs to governments will eventually lead to large tax increases, sharp cuts in nonhealth spending, or both.

This chapter reviews the causes and consequences of health care spending growth and discusses how spending can be more efficient and of higher value in the context of a consumer-driven, market-based system. The emerging consumer-driven health care movement aims to empower consumers with improved information and ability to make choices about their own health care, which in turn can result in increased provider competition to better serve patients' needs at lower costs. The key points of this chapter are:

- Growth in spending on health care has been much more rapid than general inflation, straining consumers, employers, and government budgets.
- Perverse tax and insurance incentives have led to inefficient levels and composition of spending on health care. Some increased spending has produced valuable health improvements, but in a better-functioning health care market these improvements could be attained at lower cost.
- Promoting a stronger role for consumers is a promising strategy for improving health care value and affordability.

The Growth in Health Care Spending

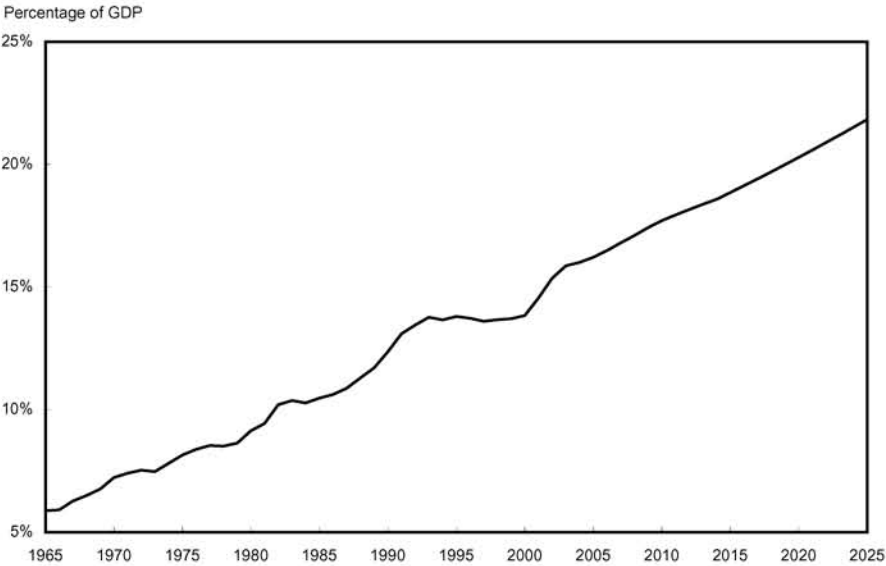
Spending in the health care sector has steadily grown from under 6 percent of GDP in 1965 to 16 percent of GDP in 2004. If current trends continued, health care spending would be projected to reach 19 percent of GDP by 2014

and 22 percent by 2025 (Chart 4-1). Since 1965, the government share of total health spending has risen from 25 percent to over 45 percent, mainly due to increased eligibility and generosity of Medicare and Medicaid. (Medicare is a Federal government program that pays for health care for senior citizens and those with certain disabilities. Medicaid, financed by both Federal and state governments, is focused on providing health care for the poor.) Medicare spending alone is projected to increase from 2.6 percent of GDP in 2006 to 4.3 percent by 2025. Among those without access to Medicare or Medicaid, most expenditures are financed by private health insurance (64 percent), provided mainly through employers (91 percent of those with private insurance). The rising costs of health care are reflected in premiums (employer plus employee share) for employer-provided insurance that in 2005 averaged almost \$11,000 for a family (Chart 4-2), up from \$6,700 in 1999 (in 2005 inflation-adjusted dollars). Per capita health care spending in the United States has risen from about \$4,500 ten years ago to about \$6,500 today (in 2005 dollars).

The United States today spends roughly twice as much per capita on health care as other industrialized countries, such as the other members of the Organization for Economic Cooperation and Development (OECD). This large difference in part reflects higher levels of per capita income and output

Chart 4-1 National Health Expenditures as a Percentage of GDP

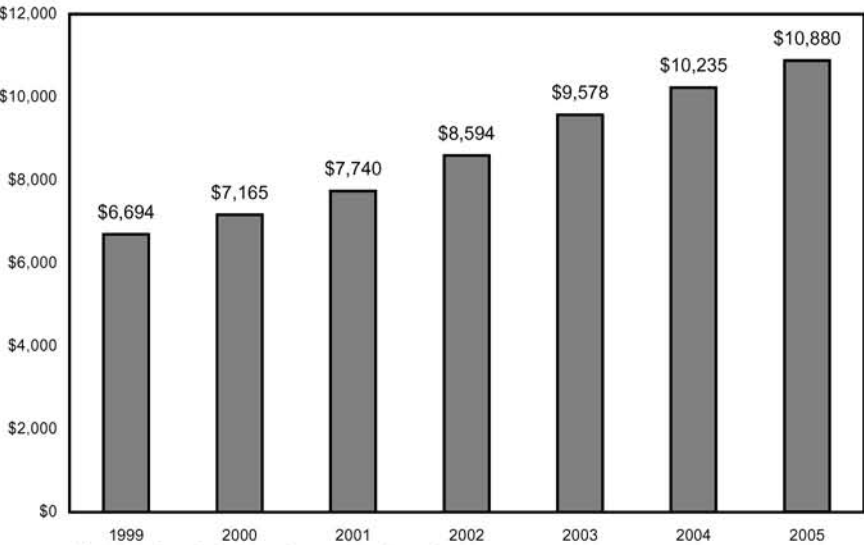
National health expenditures have risen dramatically and are projected to continue rising.



Source: Department of Health and Human Services (Centers for Medicare & Medicaid Services) and Council of Economic Advisers.

Chart 4-2 **Family Health Insurance Premiums 1999-2005**

Annual premium (2005 dollars)



Note: Premiums include employer and employee share.

Deflated by the Consumer Price Index Research Series.

Source: Kaiser Family Foundation Employer Health Benefits Survey 1999-2005.

in the United States, since richer countries tend to spend proportionately more on health care, but the United States spends a substantially larger share of GDP on health care than other wealthy countries do. For example, the United Kingdom spends about 8 percent of its GDP on health care, compared with the United States' 16 percent. The U.S. expenditure as a percent of GDP is more than six percentage points higher than the average in OECD countries. Rates of spending *growth*, however, are much more similar across countries. For example, from 1998 to 2003, average real health care spending increased 4.6 percent per year in the United States as compared to 4.5 percent in the OECD as a whole. This suggests that many of the underlying international spending differences stem from longer-term factors.

When looking at these statistics, it is also important to remember that buying more health care is not necessarily equivalent to buying more health. Health care is one of many different determinants of health status, and for many people marginal increases in health care consumption may be less cost-effective than marginal increases in spending on other determinants such as a healthier lifestyle (exercising, not smoking, eating a healthier diet). Evaluating the relative cost-effectiveness of spending on different health determinants can be challenging, however, in part because it is difficult to measure the quality of health services consumed.

Where Health Spending Has Grown

There have been significant increases over time in all major spending categories, including outpatient, acute inpatient, long-term care, and pharmaceuticals. Both personnel costs and goods costs have increased. Spending has grown for both privately and publicly financed and delivered care.

One might guess that the aging of the U.S. population would explain an important part of the increase in health care costs, especially since about one-quarter of health care in a given year is spent on those who die that year. Research suggests, however, that less than 10 percent of the growth in health spending over the last several decades can be attributed to this factor. Another contributing factor might be America's rising prosperity, because richer individuals and nations demand more health care, but again this factor can only account for a relatively small portion of the health care spending growth. Various studies have speculated about the contribution of other factors such as rising obesity, but there is as yet no consensus on the importance of these factors. There is general agreement, however, that the rapid growth in development and use of expensive new health care treatments accounts for a large share of overall health care spending growth over time.

A useful framework for understanding increases in medical spending breaks these spending increases into three components: (1) changes in the quantity demanded of existing health-related goods and services, (2) changes in the prices of those existing goods and services, and (3) the effects of technological advances that change the available set of health-related goods and services. The next part of this section looks at each of these three factors.

Quantity of Health Care Demanded

Do we demand higher volumes of health care today than in the past? While we clearly consume more of some types of care (based on higher incomes, changing medical needs, etc.), health care visits per capita have not increased. The biggest components of health care spending are physician and hospital services. Doctor visits per capita dropped somewhat from 1980 through the mid-1990s, and have increased only modestly since then. The number of hospital discharges per capita and the average hospital length-of-stay, however, have declined dramatically—they were 50-percent higher in 1980 than in 2000. Growth in spending within the United States does not seem to be explained by increased visits to the doctor or hospital.

Moreover, international differences in spending cannot be explained by differences in the quantity of physician and hospital visits. In fact, doctor visits and hospital nights per capita in the United States are lower than in many OECD countries. For example, in 2000 the United States had 0.7 hospital nights per capita, compared to 0.9 nights in the United Kingdom, 1.3 nights in Switzerland, and 1.9 nights in Germany. Service *intensity* in the

United States is very different, however, with U.S. hospital staffing levels at double the OECD median. Thus, while Americans have fewer health care contacts, they appear to receive more services at each contact. This difference explains in part why the average U.S. hospital night costs three times the OECD average.

Health Care Prices

The official medical consumer price index (medical CPI), which measures price increases for medical goods and services and is published by the Department of Labor's Bureau of Labor Statistics, indicates that health care prices over the last few decades have grown more rapidly than prices of other goods and services in the economy. From 2000 to 2004, the health care component of the CPI grew 19 percent compared to only 10 percent for the general CPI, indicating 9 percent real growth in health care prices. Thus of the 33 percent growth in total per capita health spending over this period, one-quarter apparently derived from increases in the prices of health care relative to other goods and services.

Why would health care prices rise so rapidly? One possible explanation for these recent price increases is that supplier consolidation has led to reduced competition among health care providers, enabling hospitals and physician groups to leverage market power to raise prices. For example, there were about 900 hospital consolidations during 1994-2000 (from a base of roughly 6,000 hospitals). Some of these mergers have appeared to result in monopolistic price increases, and even some major metropolitan areas have become dominated by just two or three hospital systems. It is not clear how important such trends will be in the future, however, in the face of vigorous antitrust enforcement.

Part of the apparent increase in relative prices may, however, be the illusory result of measurement problems. Standard price indices such as the medical CPI may overestimate price growth in health care if they do not adequately account for improvements in health care quality. Price indices are supposed to reflect price changes for a given product. However, because health care quality is constantly increasing, rising prices for a given health care visit may reflect improved quality, rather than just higher costs for a given level of care. For example, the coronary artery bypass graft that the average patient receives today may result in fewer complications and longer and higher quality of life afterward than would have been the case for a patient receiving the procedure 10 years ago—so the higher price paid for the procedure reflects in part the fact that the patient is receiving more “health,” not just paying more for the same service.

That said, higher prices for medical services do appear to be an important part of the explanation for why the United States spends more on health care than other OECD countries do. For example, one study of Australia,

Denmark, France, Canada, Germany, and the United Kingdom found that physician wages in the United States are 77 percent higher than the average across those countries. This does not mean, however, that those countries provide a model that should be emulated: Heavy price regulation in some countries has led to long waiting lists for certain types of medical services. One recent survey found that over half of patients in Canada and the United Kingdom had to wait longer than a month for a specialist appointment, compared to less than a quarter of patients in the United States. Similarly, more than a third of patients had to wait longer than four months for elective surgeries in Canada and the United Kingdom, compared to fewer than 10 percent in the United States.

There is a common perception that drug prices are unduly higher in the United States than in other OECD countries, perhaps due to aggressive price negotiation by European governments, but recent research suggests that this may be misleading for several reasons. First, carefully accounting for manufacturer discounts to insurers in the United States shows price differences to be smaller than simple retail price comparisons would suggest (U.S. prices are discounted by about 8 percent on average). Second, U.S. consumers use a much higher proportion of generic drugs than do consumers in other countries (e.g., 58 percent of units in the United States versus 28 percent in France). When comparing average prices paid for each active ingredient (whether generic or name brand), rather than only prices for selected name brand drugs, the international price differences are further narrowed.

Furthermore, some experts suggest that wealthier countries such as the United States should pay a larger share of drug development costs than should less-wealthy countries, because of both equity and efficiency arguments. Thus, observing lower drug prices in developing countries than in the United States does not generate great controversy. Many people do not recognize, however, that the United States is also substantially richer than most other OECD countries. For example, per capita income in the United States is 22-percent higher than in the United Kingdom. After adjusting for differences in manufacturer discounts, use of generics, and per capita income, average drug prices are in fact higher in many other OECD countries. Research has found that U.S. drug prices relative to income are 7-percent lower in France, but 4-percent higher in Canada, 10-percent higher in Germany, and 25-percent higher in the United Kingdom. Thus, the United States' higher health care spending as a share of GDP does not appear to be explained by higher drug prices.

Technological Change

Research suggests that, over time, a major source of health care spending increases has been adoption of new, technologically intensive health care goods

and services. For example, one study found that average spending per heart attack case in the United States increased in real terms from \$12,000 in 1984 to about \$22,000 in 1998, and that about half of this spending increase could be attributed to the adoption of more-sophisticated technologies. This does not mean that the higher spending is not of very high value: post-heart attack life expectancy over this same period increased from five years to six years, with 70 percent of that increase attributable to the adoption of better technology.

The United States appears to use some expensive technologies more intensively than do other countries. For example, the United States has more than 50-percent more MRI units per capita than do other OECD countries on average. The United States' more-intensive use of technology partly reflects its higher rate of innovation and earlier adoption of technology. For example, angioplasty was relatively rare outside the United States in 1990, with the U.S. utilization rate three times higher than the next-closest country; Germany finally reached the U.S. level by about 1998, while adoption in other countries continued to lag.

It is worth noting that the adoption of new technologies does not inevitably raise costs. New technologies regularly reduce costs in many other sectors of the economy, such as the semiconductor industry. In the U.S. health care industry, however, the combination of technological change along with muted consumer incentives to demand lower costs is responsible for a significant portion of rising health care spending.

First-Dollar Insurance Inhibits Consumer Cost-Consciousness

In most markets outside of health care, consumers decide what to purchase by comparing the price of a good or service against the benefit it brings them. By contrast, in the health care sector, consumers often do not learn the prices of goods and services consumed until bills are received weeks or months later, if ever. Instead, physicians are expected to make health care consumption choices for patients, despite the fact that physicians frequently lack the incentive to match the benefits of care with its costs, and may even lack information about the costs themselves. A major reason for this lack of consumer incentive is the fact that many health insurance policies provide close to “first-dollar coverage” of health care costs. That is, people with health insurance typically pay only a relatively small portion of the total cost—or in some cases, literally none of the cost—of the health care services they receive. This section reviews the causes and consequences of first-dollar insurance coverage.

Causes of First-Dollar Insurance Coverage

Unlike most other types of insurance, health insurance in the United States often includes first-dollar coverage of the cost of even routine, predictable services. By contrast, most other forms of insurance focus on protecting the insured from large and unexpected losses. If automobile insurance had the first-dollar coverage of even routine services that many health insurance policies offer, it would cover the costs of oil changes and new tires, rather than just protecting against unpredictable catastrophes such as automobile accidents.

Health insurance policies have this unusual first-dollar coverage feature in large part because the tax code makes it cheaper for people to purchase health care indirectly through insurance than directly through out-of-pocket payments (see Box 4-1). Another factor underlying first-dollar coverage is the increased use of managed care programs, which spread rapidly during the 1990s. Most managed care plans are characterized by minimal cost sharing, relying instead on gatekeepers to regulate use of resources. Interest in managed care programs has decreased recently, because of public backlash against the cost-containment measures used in these programs.

Box 4-1: Tax Preferences for Employer Health Insurance Premiums

Since the 1940s, the tax code has excluded employer payments for health insurance premiums from the portion of workers' compensation subject to taxation (both payroll and personal income taxes). The total value of the tax exclusion is quite large, reducing Federal taxes by over \$200 billion in 2006 (\$133 billion for the income tax exclusion and \$80 billion for the payroll tax exclusion), which is equivalent to about 10 percent of actual Federal tax receipts. This exclusion of health insurance premiums from taxation was a by-product of wage-control legislation during World War II (which established a precedent for treating employee benefits differently from regular wages), and was not intentionally designed to promote health insurance coverage. But this tax treatment of employer-provided health insurance premiums has had important consequences for insurance markets.

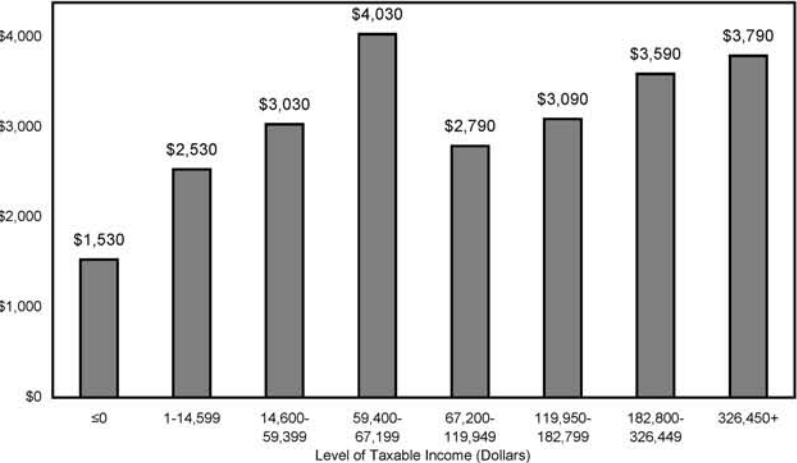
First, it has caused the private insurance system to become predominantly employment-based. More than 91 percent of privately insured individuals under age 65 receive their health insurance through their employers. Except for the self-employed, those who purchase insurance on the individual market (that is, not through their employers) must do so with after-tax dollars. The self-employed receive an "above-the-line" income tax deduction for health insurance premiums (equivalent to the income-tax exclusion for employer insurance), though they still owe full payroll taxes on the income used to buy premiums. For someone in the

15-percent income tax bracket and subject to the 15.3-percent payroll tax, a policy with a \$10,000 premium would cost roughly \$7,000 if purchased through an employer, \$8,500 if the person were self-employed, and the full \$10,000 if the person were not self-employed and purchased the policy individually. This tax treatment has created a strong financial incentive for individuals to purchase health insurance through their employer, even if their first choice of insurance product is not offered by the employer. In addition, as an incentive to buy health insurance, this tax subsidy is larger for people in higher tax brackets (as shown in the chart), despite the fact that a given subsidy amount would reduce uninsurance much more among lower-income households.

Furthermore, the employer premium tax exclusion promotes low-deductible insurance coverage with minimal out-of-pocket cost sharing. In most cases, while insurance premiums are paid with pretax dollars, out-of-pocket health spending must be paid for with after-tax dollars. For example, \$1,000 of health care services covered by full insurance costs the person with employer-provided insurance only about \$700 in after-tax dollars (assuming a 15-percent income tax bracket and 15.3-percent payroll tax), whereas those same services would cost \$1,000 if paid out-of-pocket. Because of the tax penalty for out-of-pocket spending relative to insurance premiums, there is a strong incentive for employers to provide and employees to select first-dollar coverage, even if they would have preferred higher deductibles and lower premiums in the absence of the tax provision. This has, in turn, diminished the role of consumers as guardians against wasteful spending and unduly high prices.

Annual Value of Employer-Provided Health Insurance Tax Exclusion by Income
The tax exclusion provides the greatest benefit to those in higher tax brackets.

Value of tax exclusion for \$10,000 annual premium



Note: Includes federal income and payroll taxes for a hypothetical family of four. Calculations are imprecise for incomes within \$10,000 of tax bracket ceiling.
Source: Council of Economic Advisers.

Consequences of First-Dollar Insurance Coverage

The original purpose of health insurance, like other forms of insurance, was to protect individuals from catastrophic and unexpected costs by spreading risk across a larger population. However, as discussed, health insurance in the United States has now also become a vehicle for financing relatively low-cost, routine expenditures. This use of insurance as “prepaid medical care” has three important consequences: (1) It encourages consumers to overuse certain types of health care. (2) It gives little incentive for consumers to search for the lowest-price providers. (3) It distorts incentives for technological change. Rather than focusing research incentives on cost-effective technology, it induces adoption of technologies for which costs exceed incremental benefits, while undermining the development of cost-saving technologies. We discuss each of these points.

First, heavily insured individuals, being insulated from most health care costs, have the incentive to overconsume certain types of care, a phenomenon referred to as *moral hazard*. An allergy drug may have great value for patient A who has serious symptoms, but little value for patient B who has only mild symptoms. If the two patients faced the market price of \$100/month, then A might decide the drug is worth the cost but B might forgo it, given its negligible benefit for him. With first-dollar insurance coverage, however, B might instead choose to continue taking the drug as long as the expected benefits to him were greater than zero. In this case, B’s decision would inefficiently drive up health care spending at a loss to society, since the benefit of the drug would be less than the real cost.

Some would argue that such scenarios are rare because physicians should not prescribe the drug for person B if it would be wasteful or of little practical use in improving his health. But in fact physicians may not have enough information to fully evaluate the benefit to patients, and often have little incentive to limit inappropriate care to highly insured patients. Providing extra services increases their incomes and protects them from the charge that they did not take every action with conceivable benefit to the patient. Box 4-2 discusses the role of medical malpractice liability in increasing medical expenditures.

In order to quantify the moral hazard effects of first-dollar insurance coverage, the RAND Health Insurance Experiment randomized individuals into health insurance plans with different *co-insurance* levels. (Co-insurance refers to the percentage of health insurance spending above the deductible an individual must contribute.) A higher co-insurance level gives both the patient and the doctor greater incentive to avoid the use of drugs or procedures that are costly and have low expected benefit. The study found that changing the structure of health insurance does affect the behavior of patients and their

Box 4-2: Medical Liability Costs

Substantial costs in the U.S. health care system are associated with the medical liability system. This affects health care spending in several ways. First, the cost of malpractice damage awards, the legal costs of malpractice lawsuits, and the costs of underwriting malpractice insurance policies are passed on to providers through malpractice insurance premiums and then to patients through out-of-pocket payments and insurance premiums. Second, defensive medicine—ordering tests and procedures solely to guard against potential malpractice claims—may have an even bigger effect on health care spending than the direct costs associated with malpractice suits.

The President has called on Congress to pass liability reforms to make the system fairer and more predictable while reducing wasteful costs. The trend toward greater consumer decision making in health care may have complementary effects in reducing liability costs associated with defensive medicine. Consumers with first-dollar insurance coverage have little incentive to decline many of the tests and procedures suggested by physicians, even if they and their physicians understand that there may be very little health benefit from the increased spending. But as consumers pay for a greater portion of noncatastrophic care, they may decide to forgo expensive and unnecessary tests and procedures suggested by physicians primarily to avoid lawsuits rather than to improve patients' health.

doctors. Specifically, individuals with first-dollar coverage had 45-percent higher health expenditures than individuals who were randomly assigned insurance plans with 95-percent co-insurance up to a catastrophic out-of-pocket maximum level (the out-of-pocket maximum was about \$3,500 in today's dollars). Importantly, the extra care received in the first-dollar coverage plans produced no discernible extra health benefits in the studied sample as a whole. There were, however, some health benefits for select subpopulations of low-income and chronically ill individuals, suggesting that care should be taken not to expose lower-income families to excessively high cost sharing relative to their income, and that certain preventive measures such as chronic-disease management are important to exempt from cost sharing. For most services consumed by the majority of the population, however, the RAND study showed that higher cost sharing can be a powerful tool to induce consumers to take responsibility for focusing their health care spending on only those products and services with the highest value.

A second consequence of first-dollar insurance coverage is that consumers are less sensitive to the prices of health care consumed, an outcome that dulls the competitive forces that keep prices down in most other markets. Many insurers attempt to reduce the range of choices available to enrollees through mechanisms such as selective contracting and preferred provider networks, but such practices are even more effective when the consumer is also price-sensitive. Imagine two hospitals that provide the same service, but hospital A charges \$1,000 and is located in an older facility while hospital B charges \$2,000 but is located in an updated facility with a wide array of amenities and equipment on site. Given these choices, a consumer facing the actual price may prefer hospital A, but in a world of first-dollar coverage, most people would choose hospital B, even if the extra amenities of hospital B provided only modest benefit. As a result of this structure of incentives, health care providers may compete for patients by providing greater convenience or amenities with little incentive to control costs. This lack of price sensitivity on the part of the consumers of health care is one of the major forces underlying the rapid growth of health care costs.

A third consequence of first-dollar insurance coverage is distorted incentives for technological development. One type of distortion is that new technologies may be developed and marketed even when they are of low incremental cost-effectiveness relative to other available options. For example, if a new drug is even slightly more effective than an existing drug, a person with first-dollar insurance coverage may demand the new drug even if it is priced well above existing satisfactory and effective alternatives. When consumers have dulled price incentives pharmaceutical companies will invest in bringing a new drug to market even if it provides little new value. In a world in which most consumers had high-deductible insurance and were sensitive to the full cost of drugs, the pharmaceutical company might choose not to spend the large amount of resources necessary to complete clinical trials and bring the drug to market if they knew its incremental improvement over existing drugs would be small.

Likewise, dulled price sensitivity on the part of consumers reduces the incentive to develop cost-reducing technologies. In many other sectors of the economy, such as computer memory chips, technological progress results in cheaper and more cost-effective products each year as producers look for more-efficient manufacturing processes and product innovations to keep them ahead of their competitors. In health care, this type of technological innovation is much rarer, since few consumers have the incentive to adopt a cheaper product, particularly if it has even slightly lower effectiveness. If more health care consumers were to become price sensitive, the health care sector would have the incentive to pursue more such cost-reducing technologies that could, over the long term, help reduce the rate at which health care spending is growing.

Some observers have expressed concern that changes to the current system might be harmful if they result in reduced innovation, but these observers have often failed to distinguish cost-effective from cost-ineffective innovations. Life expectancy at birth has increased from 70 to almost 78 years since 1962. In addition to living longer, we are also enjoying more years in better health and with fewer disabilities. While some of these health improvements have been due to lifestyle changes, some can clearly be traced to medical technologies, such as those that have reduced infant mortality, improved survival rates after heart attacks, improved treatment of depression and other mental illnesses, and improved the management of chronic illnesses. Research suggests that *on average* our spending on new medical technology has indeed been cost-beneficial. This indicates that, as a society, we would not want to return to the health spending levels of 1960, for example, if doing so also meant returning to the types of medical care available in 1960. But economic efficiency depends on each (“marginal”) individual new technology being cost-beneficial, not just the average of all technologies. The fact that on average our investment in medical technology has paid off does not preclude the possibility that our system contains significant inefficiencies, and that some of the new technology may have contributed little compared to the amounts spent on it. If consumers were given the information they need about the actual costs and benefits of various treatments, as well as the incentives to compare those costs and benefits, it might be possible to eliminate some of that wasteful spending.

Consequences of Inefficient Health Care Spending

Rising health care spending is a burden to employers, consumers, and taxpayers. Employers who offer insurance complain that rising premiums strain their labor relations and threaten their balance sheets. Rising premiums make health insurance less affordable, contributing to the ranks of the uninsured. Those who are insured face rising out-of-pocket costs and lower cash wage growth. And taxpayers must finance the rapidly increasing costs of publicly provided health care for seniors, the disabled, and the poor.

Private Spending

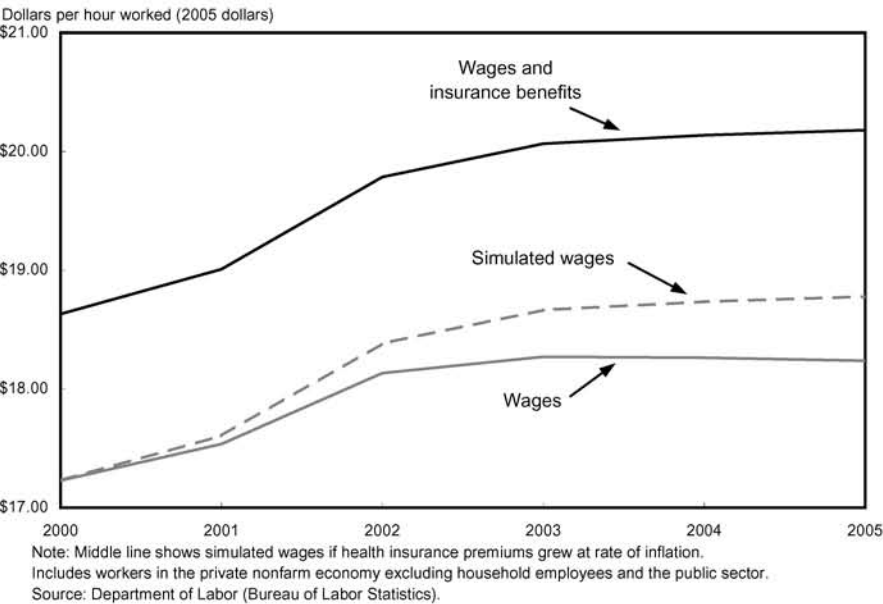
As consumers spend more of their budgets on health care, they must spend less on other goods and services. Since 1980, for example, the share of consumer spending that has gone to medical care has increased from 10 percent to 17 percent, while the shares of spending on items such as food and clothing have decreased. Of the \$7.5 trillion increase in personal income

since 1980, \$1.5 trillion has been devoted to health care. Similarly, of the \$2.19 real increase in hourly compensation over the past five years, \$0.54 (25 percent) has gone toward higher health insurance premium costs. Thus, take-home pay has grown more slowly than total compensation (including health insurance and other benefits) (Chart 4-3).

The costs of health care would be of less concern if most health care spending reflected optimal decisions by consumers weighing the costs and benefits of the services they buy. For example, the fact that consumer spending on DVDs increased 31 percent in 2004 alone has not alarmed anyone nor led to calls for government intervention. But spending on private health care is different, because health care is considered a “merit” good deserving of government support for those that cannot afford it, because of the government’s extensive role in the health care market, and because of the forces that interfere with the efficient allocation of resources.

Employers have also been affected by increasing health care costs. In particular, firms that have promised generous health benefits to retirees have borne increasingly heavy costs. The economic consequences of this may include the need for restructuring of some of these firms, loss of expected benefits for some retirees, and potential costs to taxpayers if some of these retirees increase their reliance on public health insurance. Rising costs for current employees have also affected employer behaviors. Some employers have tried to reduce their insurance costs by hiring more part-time workers (who are generally

Chart 4-3 Real Hourly Compensation of the Civilian Population
Health insurance spending growth exerts downward pressure on wages.



ineligible for insurance benefits), asking employees to contribute more to premiums, reducing the generosity of the plans they offer, or discontinuing health insurance benefits altogether.

In the long run, however, it is not the employers but rather the workers who bear the burden of rising health insurance costs. Economists have shown that even though employers may make the bulk of the payments to cover the health insurance premiums of workers, these payments are treated just like wages or any other component of workers' total compensation. This total compensation depends on worker productivity and labor-market supply and demand. Rising insurance premiums may thus change the mix of workers' compensation by increasing health benefits and decreasing wages, but if they do not affect workers' productivity they will not lead firms in competitive markets to raise total compensation. Institutional factors such as minimum-wage laws and sluggish wage adjustment may mean that health insurance premiums affect employer profits in the short run, but in the long run most or all of increases in health insurance costs are shifted to employees in the form of wages that are lower than they otherwise would have been.

Public Spending

When per capita spending on health care rises rapidly, the pressures on government programs become particularly intense. First, if the standard of care received by enrollees in government programs is not to differ too radically from that of the general public, the costs of helping those already enrolled in the programs will rise as well. Second, rising insurance premiums may cause some people to drop private insurance and to rely instead on public insurance such as Medicaid or on safety-net providers (e.g., uncompensated hospital care) subsidized by taxpayers. Not only does rising uninsurance lead to higher government costs, but uninsured people often consume health care resources inefficiently—for example, by failing to obtain preventive care, delaying necessary care, or overusing emergency rooms relative to less-costly clinic settings.

The largest government programs that finance health care for those not otherwise insured are Medicare and Medicaid. These programs are becoming increasingly expensive to taxpayers. For example, according to projections, if current trends were to continue unchecked, Medicare costs would increase from the current share of 2.6 percent of GDP to 6.9 percent by 2050. Medicaid, jointly financed by the Federal and state governments, is also becoming an increasingly large share of budgets, with just the Federal portion of spending projected to increase from 1.5 percent of GDP today to 2.5 percent by 2050. The costs of these public programs are unsustainable under any reasonable projections. Closing the currently projected 75-year deficit in just the Hospital Insurance (HI) portion of Medicare would require

tax increases of 107 percent or benefits reductions of 48 percent. Ultimately, the benefits paid by these programs must be significantly pared back, the taxes dedicated to their support must be increased, or major reforms must be enacted that slow the rate of growth in health care spending.

Strengthening the Role of Health Consumers Through Public Policy

This chapter has discussed the central role of first-dollar insurance coverage in dulling the incentives for consumers to shop carefully for cost-effective health care. By giving consumers both the incentives and the information needed to become better shoppers for health care, public policy can help control the growth in health care costs and improve the efficiency of the use of health care resources.

The President has proposed a wide-range of measures to help make health care more efficient and accessible, such as improving community health centers, reforming medical liability laws, creating Association Health Plans for small businesses, allowing insurance to be more portable and purchased more easily across state lines, and many other reforms. This section will focus specifically on proposals that help improve incentives for consumers.

An important policy advance has aimed to reduce the bias toward first-dollar insurance coverage by allowing more out-of-pocket health care expenditures to be paid with pretax dollars through the innovative mechanism of Health Savings Accounts (HSAs). Complementary initiatives to improve information available to consumers for making appropriate health care choices can help facilitate the movement toward HSA-based consumer-directed health care.

The potential benefits of reforms that slow spending growth could be great. Consider a scenario in which new policies successfully reduce future national health spending by one percentage point per year, through a combination of short-run quantity decreases, medium-term price decreases, and long-run increases in cost-reducing technological change. If spending were to grow by 6 percent per year, instead of by 7 percent per year as currently projected, by 2025 the expected health share of GDP would be reduced from 22 percent to 18 percent, a substantial difference.

Health Savings Accounts (HSAs)

HSAs are tax-favored accounts to which individuals can contribute funds they can then use to pay current and future out-of-pocket medical expenses. These accounts were signed into law by the President in 2003 and went into

effect in 2004. HSAs represent a major improvement over previous tax-preferred medical spending accounts such as Flexible Spending Arrangements (which must be exhausted each year, a factor that limits their use) and Health Reimbursement Accounts (which are owned by employers, not consumers). In contrast, HSAs are owned by individual consumers regardless of employer, and unused account balances can be retained and grow from year-to-year without penalty. HSAs are designed to be used in conjunction with high-deductible health plans, defined as plans having minimum deductibles (currently \$1,050 for individuals and \$2,100 for families) with annual out-of-pocket limits (currently no more than \$5,250 or \$10,500 for individuals and families, respectively). Deductibles and out-of-pocket limits are indexed to adjust over time with inflation. Certain types of preventive care may be provided with first-dollar coverage if deemed appropriate by the insurer.

HSA enrollees with qualifying insurance plans may contribute annually up to the lesser of the plan deductible or \$2,700 (individuals)/ \$5,450 (family). These contributions are excluded from income taxes both at the time of deposit and at the time of “qualifying” withdrawal; the funds may be used to pay for out-of-pocket medical expenditures, rolled over indefinitely, or withdrawn after age 65 (in which case they are taxed as ordinary income if not used for health expenditures).

A key benefit of HSAs is that they lower the previous tax bias toward low-deductible or first-dollar health insurance relative to higher-deductible policies with higher out-of-pocket spending. To illustrate this point, consider a sample health insurance purchaser facing the choice of a low-, medium-, or high-deductible plan. Table 4-1 illustrates how this person’s premiums depend on the plans’ deductibles, according to actuarial estimates for a representative person. The premium for a \$250 (low) deductible policy with a \$2,000 out-of-pocket limit would be \$4,000, but that premium could be lowered by \$1,600 (or 40 percent) by moving to a catastrophic policy with a \$2,500 (high) deductible and an out-of-pocket limit of \$5,000. Suppose that this person had no health expenditures in the first year of coverage, but a \$15,000 catastrophic event in the second year. How is her total two-year spending on health care under these plans affected by the tax code?

- *If there are no tax preferences:* If she buys the traditional (low deductible) plan, her spending is \$4,000 in premiums in each year plus \$2,000 out-of-pocket in year two, totaling \$10,000. If she buys the catastrophic (high deductible) plan, her spending is \$2,400 in premiums in each year plus \$5,000 out-of-pocket in year two, totaling \$9,800. Thus, she would be slightly better off financially under the catastrophic plan in the absence of tax preferences.
- *If insurance premiums (but not out-of-pocket spending) are tax-preferred:* Under the traditional plan, if she is in the 30-percent marginal tax

TABLE 4-1.— *The Premiums Charged for Three Sample Health Insurance Plans with Different Patient Cost Sharing*

	Examples of Three Insurance Plans		
	Low Deductible	Medium Deductible	High Deductible
Premium	\$4,000	\$3,500	\$2,400
Cost Sharing			
Deductible.....	\$250	\$1,000	\$2,500
Coinurance after Deductible.....	20%	20%	20%
Out-of-Pocket Maximum.....	\$2,000	\$3,000	\$5,000

The premiums in this table represent the actuarial value of each plan for a representative enrollee.

bracket, she receives a \$2,400 tax subsidy (over two years), but under the catastrophic plan she only receives a \$1,440 tax subsidy. Thus, the tax subsidy makes her prefer the traditional plan where she might otherwise have preferred the catastrophic plan.

- *If tax-preferred HSAs are available:* If she contributes the maximum \$2,500 to the HSA in both years, she would receive a new \$1,500 tax subsidy by using the HSA to pay her out-of-pocket expenses in year two with tax-free dollars. This mitigates the previous tax-induced bias against catastrophic plans, again making her better off financially under the catastrophic policy.

This illustration of course simplifies many dimensions of the comparison between policies. For example, it ignores the fact that catastrophic events are rare, so that most people would be able to accumulate many more years of premium and HSA savings, further increasing the attractiveness of the HSA-qualified plans. In addition, the example ignores the moral hazard effect of reduced health care utilization in the catastrophic plan, as the patient now has increased incentive to shop carefully for health care.

Not all individuals will benefit equally from moving to a high-deductible policy. First, some poorly informed consumers may forgo recommended care, such as preventive services—care that they might have received under a traditional low-deductible policy. The HSA provision that allows plans to waive the deductible for preventive care is designed to mitigate this possibility. Second, some chronically ill individuals with persistently high spending may be relatively worse off, to the extent that high-deductible policies lead to less cross-subsidization from healthier people in their risk pool. This could be mitigated while preserving the beneficial effects of cost sharing, for example, through improved insurance benefits for the chronically ill, differential premium cross-subsidies in employer insurance, or targeted high-risk-pool subsidies in the individual market. Third, credit-constrained enrollees and

those in lower tax brackets will benefit less from provisions allowing tax-free HSA contributions and accumulation. This is also true of the tax exclusion for employer health insurance premiums. These concerns must be balanced against the potential benefits of greater price sensitivity by health care consumers: As more consumers shift into high-deductible plans, there is greater potential for slowing price growth and long-run increases in cost-reducing technology, which could benefit even consumers in traditional insurance plans.

Since the inception of HSAs in 2004, the number of people enrolled in high-deductible HSA-qualified plans has increased rapidly. The new tax benefits that further lower health costs for high-deductible plans have made them attractive not only to the uninsured and small businesses, but to large firms as well. Although HSAs are new enough that comprehensive data are difficult to obtain, as of January 2006, at least 3 million people were covered by HSA-qualified plans sold by insurance company members of the industry group America's Health Insurance Plans (AHIP). Of the people covered by AHIP-related plans, about half purchased their plans in the individual market and 14 percent through small businesses.

Additional tax-code changes could make high-deductible HSA-qualified plans even more attractive and affordable, further strengthening incentives for more consumers to be well-informed, cost-conscious health care decision makers. The President's 2007 budget aims to expand HSAs through proposals that include:

- *Raising the HSA contribution limits up to the plan out-of-pocket maximum.* Current law allows contributions only up to the deductible level, which is often less than half of the out-of-pocket maximum. This change would further limit the tax-induced bias against out-of-pocket spending for medical care. It would also increase the attractiveness of HSA-qualified plans, in particular for the chronically ill who have a higher probability of out-of-pocket spending above their deductible.
- *Further reducing disparities in tax treatment of HSA contributions versus insurance premiums.* Currently, individual contributions to HSAs are excluded from income taxes but not payroll taxes (employer contributions are excluded from both). The President proposes to provide a new income tax credit equal to the payroll taxes paid on the HSA contribution amounts. This will further remove distortions that have encouraged first-dollar insurance coverage. When combined with the first new proposal discussed above, Americans with HSAs would be able to pay all of their out-of-pocket expenses with pretax earnings.
- *Equalizing tax preferences for purchasing HSA-qualified insurance in the employer and individual markets.* The President proposes to exclude from income taxes the value of HSA-qualified insurance premiums if

purchased on the individual market. In addition, taxpayers purchasing these policies on the individual market would receive a new income tax credit equal to the payroll taxes paid on the premium amounts. Thus, all taxpayers would receive the same tax treatment of HSA-qualified insurance premiums, even if working for one of the 40 percent of employers that do not offer health benefits.

- *Helping the chronically ill.* In addition to allowing all out-of-pocket expenses to be paid tax-free through an HSA, the President also proposes allowing employers to make larger HSA contributions for their chronically ill employees so that employers can make HSA-qualified plans equally attractive to all employees regardless of health status. Finally, the President proposes \$500 million in annual grants to states to test innovative solutions to subsidize insurance for the chronically ill, in order to enhance the functioning of markets for individual insurance. For example, states could use the funds for risk-adjusted premium subsidy programs, or for creative enhancements of state high-risk pools such as funding HSA accounts for enrollees.
- *Enhancing affordability via a tax credit for low-income people purchasing HSA-qualified insurance in the individual market.* The credit would be worth up to \$1,000 for one adult, \$2,000 for two adults, or \$3,000 for families (not exceeding 90 percent of the premium). It would phase out at incomes of \$30,000 for individuals and \$60,000 for families. The credit would be advanceable, paid directly by the government at the time of insurance purchase.

Informed Consumers Are Better Consumers

It is important to provide incentives for consumers to choose health care providers and services sensibly, but providing those incentives does not guarantee that consumers will in fact be able to make good choices. Consumers must also have access to the information they need to make good health care decisions. Key information includes:

- *Provider prices.* Few medical providers today advertise their prices in a way that allows for comparison shopping. Several insurers have taken an important step by beginning to make available schedules of physician fees to their enrollees. Hospital fees raise more-difficult issues, since prices negotiated between hospitals and insurers are frequently subject to confidentiality agreements, despite the fact that consumers eventually observe the prices on bills presented to them after the fact. Of even greater use to consumers would be information on “package prices” for complete treatments of medical bundles or episodes. For example, a knee replacement without unusual complications might have ten major components of care, each of which is now billed separately. A package

price for the entire treatment would provide an estimated cost for the entire operation, hospitalization, and follow-up treatment. This information could be combined with revised billing procedures, which would allow patients to identify more easily the costs associated with the treatment they had received. The President strongly supports efforts to increase price transparency in the health care market. He has called for hospitals, physician groups, insurers, employers, and other health groups to cooperate in speeding the transition toward a market in which Americans can easily obtain user-friendly and comparable information on prices when shopping for health care.

- *Data on provider quality and value.* Price information by itself is not sufficient for good decision making in the absence of comparative quality data. There is growing interest in providing accurate and usable measures of the quality of care offered by individual health care providers such as hospitals and physician groups. Great progress has been made by researchers in improving the methodology for developing reliable measures, and insurers are now helping to improve the effective dissemination of such data. Measures that combine price and quality data into indicators of overall value are not yet as well developed, but would be another useful decision-making tool.

Better information would also be of use to providers of medical services, who would then be better able to help their patients make sound, cost-effective decisions. Examples include:

- *Practice guidelines.* One key barrier to more-efficient health care spending is the lack of a research base on the appropriate treatment in many medical situations. There is a clear role for government in this area. For example, the Agency for Health Research and Quality (AHRQ) is sponsoring comparative effectiveness research studies relating to medical practice, as authorized under the 2003 Medicare Modernization Act. Such research can produce high returns in terms of improved health care efficiency. Further work to translate such guidelines into educational materials for health care consumers would also greatly enhance the ability of consumers to make wise health care choices.
- *Cost-effectiveness studies.* If the usage of expensive but low-value technologies is to be reduced by the actions of better-informed consumers in consultation with their doctors, then more information is needed about the cost-effectiveness of various technologies and procedures, and about how cost-effectiveness depends on particular factors such as the patient's age and specific condition. Private insurers sponsor some such studies, but the private sector will tend to underinvest in this type of "public good" research. Government support for research in this area, such as the research being conducted by agencies such as AHRQ, has a strong economic justification.

Conclusion

As the United States grows richer and older and as new life-saving technologies develop, Americans are likely to continue to spend a rising share of their growing incomes on health. Indeed, our health care spending overall has returned good value, with Americans living longer and healthier lives. We could achieve this improved health at lower cost, however, by promoting a greater role for consumer decision making in health. Health Savings Accounts provide one tool for doing so, by leveling the playing field for people who prefer to save money by moving toward higher-deductible health insurance policies. As health researchers, the insurance industry, and government work to develop better consumer decision-making tools, more consumers will be able to benefit from moving to such plans. In the long run, the payoff to allocating health care resources toward higher-value and more cost-effective care would be great.

The U.S. Tax System in International Perspective

All governments face two important decisions. They must choose the scope and scale of public goods and services to provide for their citizens, including national defense, public safety, education, law enforcement, and social insurance. They must also decide how to collect the funds to finance those public services, including what things to tax and at what rate to tax them. These tax policy decisions affect job creation, the allocation of resources, economic efficiency, economic growth, and ultimately the living standards of their citizens. In this chapter, we examine U.S. choices in the context of the varied choices of other countries around the world.

Recent calls for fundamental tax reform reflect long-standing public frustration with the complexity of the U.S. system and dissatisfaction with its economic effects. Last year's *Economic Report of the President* outlined the need for tax reform and evaluated several prototypes for reform. The President created a bipartisan Advisory Panel on Federal Tax Reform that spent the year evaluating the current tax system and recommended two options for reform. This chapter provides a broader context for evaluating these and other potential reforms.

This chapter makes three essential points:

- Every country makes fundamental choices about its tax system: what level of overall tax burden to impose, what to tax, and what tax rates to apply. These choices matter because they have important economic consequences that affect the living standards of their citizens.
- The United States has made different choices than other countries: We have a relatively low tax burden, and we finance more of that burden with a tax on personal income instead of consumption.
- When viewed in an international perspective, the U.S. system has been improved by some significant changes but could benefit greatly from others, particularly those focused on reforming the taxation of capital income.

Fundamental Choices in Tax Systems

The two fundamental questions that must be answered in designing a tax system to raise revenue for government expenditures are what to tax (the “base”) and how much to tax it (the “rates”). Public discussion of tax policy often also focuses on the distributional consequences of these decisions, which

are certainly important. However, economists point out that the answers to these two fundamental questions have equally important implications for the economic decisions made by individuals and small and large businesses, and thus for the overall performance of the economy. In this section we discuss these tax policy choices and their effects on economic decisions.

Designing a Tax System

Governments choose the size and scope of the public services they wish to provide and the corresponding level of spending required. At the same time, they choose how to finance that spending, through a combination of taxation and borrowing. The use of borrowing (deficits) to finance government spending has varied over time, and the optimal level depends on many factors. For example, economists have argued that it is reasonable to borrow to finance temporary increases in spending (e.g., during times of war or to provide aid after a disaster) or temporary declines in revenue (as in a recession). In any case, the cost of government borrowing must ultimately be financed by tax revenues, and so we focus here on the tax system.

Every tax system is defined by two factors: the tax base and the tax rate structure. The base defines what is subject to taxation and the rate determines what portion is taken in tax. We begin by considering two of the most common tax bases used: income and consumption.

A tax system with a pure income tax base is designed to tax all of the resources that increase a taxpayer's ability to consume, regardless of what that taxpayer actually does consume. Taxable income under this system includes all wage and salary income, interest income, and dividends, and also can include increases in wealth such as unrealized capital gains and noncash income such as the implicit rental value of owner-occupied housing. In short, under a pure income-based tax system, all income plus all increases in wealth can be subject to taxation.

A consumption-based tax system, in contrast, taxes only the share of income that is consumed, exempting the share that is saved. Examples of consumption-based tax systems, such as a national retail sales tax, a value-added tax, a consumption-based Flat Tax, or a consumed-income tax, were presented in Chapter 3 of the 2005 *Economic Report of the President*, which addressed "Options for Tax Reform."

The U.S. tax system is neither a pure income tax nor a pure consumption tax, but rather a hybrid of the two. Although nominally based on income, the U.S. system excludes significant portions of the return to savings from the tax base (e.g., interest earned on assets held in a 401(k) employment-based retirement plan or an Individual Retirement Account). The U.S. system also excludes other forms of income from the tax base, two key examples being the

premiums paid by employers for employee health insurance and the implicit rental value of owner-occupied housing.

Another central aspect of designing a tax base is the treatment of international activity, both of foreigners acting within U.S. borders and of U.S. citizens and corporations conducting business abroad. Currently, the United States applies its income tax, in principle, on a *worldwide* basis, taxing all income earned by U.S. residents on their economic activity in the United States and the rest of the world, and allowing a limited credit for taxes paid to foreign governments. Taxing on a worldwide basis means the U.S. applies its tax to all economic activity in the country (regardless of the nationality of ownership) and to all activity of U.S. residents and U.S.-owned companies (regardless of the country in which that activity occurs). The United States could, alternatively, tax on a *territorial* basis, taxing all income earned within U.S. borders regardless of the nationality of the person or corporations earning the income, but not taxing income earned abroad. Territorial tax treatment would exclude from the tax base all foreign earnings of U.S. residents (both individuals and corporations). With increasing competition among the United States and other countries for economic activity, this choice also has important implications for economic growth and efficiency.

In addition to choosing the tax base, the tax authorities must also determine the tax rate structure. This choice has significant effects on both the efficiency and the equity of the tax system. Countries might choose one tax rate to apply to the entire tax base, or a progressive schedule of tax rates, with higher rates applying to those with greater resources. A key determinant of the effect of the tax system on the efficiency of the economy is the tax rate that is applied to the incremental use of resources—such as an additional dollar of income or an additional dollar of consumption. This *marginal tax* rate is important because it affects the taxpayers' incentives, and thus their economic behavior, inducing them to make decisions that are different from those they might have made in the absence of the tax. These “distortions” of behavior (relative to the no-tax benchmark) are the major channel through which the tax system affects the efficiency of the economy.

Taxes Distort Economic Decisions

Virtually all forms of taxation distort economic decision making because they change the cost of allocating resources to different uses. Those distortions have a real economic cost that goes beyond the burden of the tax being paid. The reduction in economic efficiency generated by the changes in economic behavior that a tax induces is called the *excess burden* of the tax. The excess burden imposed by a tax increases dramatically as the marginal tax rate increases. A standard demonstration in economics textbooks is that excess

burden is proportional to the square of the tax rate, so that doubling the marginal tax rate roughly quadruples the excess burden of the tax. This relationship between marginal tax rates and economic efficiency is the reason that tax systems with broad bases and low rates are generally considered the most efficient way to raise revenue.

Of course, the tax rate specified in statute may not correspond with what businesses and individuals actually pay in taxes because of exemptions, deductions, and credits that reduce their tax burden. The *effective tax* rate that people pay (and that drives their behavior) may thus be lower than the *statutory rate*. Designing a tax system involves choosing the statutory tax rates, defining the tax base including any exemptions and deductions, and specifying tax credits. The combination of those choices determines the effective tax rate that people and firms pay, and that can alter their behavior and cause distortions in the economy. In the next section we discuss the distortions created by different tax systems.

Tax Systems and Economic Distortions

The complexities of modern tax systems can change many decisions made by individuals and businesses alike. For example, individuals choose how much they work, the forms of compensation they receive (such as wages or health insurance), how much they save, and whether they own or rent a home. Businesses must choose how many workers to hire, where to locate workers and capital assets around the world, the types of assets in which to invest, and the means of financing these assets (e.g., debt, equity, or retained earnings). Taxes can affect all of these decisions.

The choice between an income-based and a consumption-based tax system affects the labor market decisions of workers, the savings decisions of families, and the behavior of entrepreneurs. For example, a worker facing a marginal tax rate of 40 percent on income (who would thus take home only \$6 for an additional \$10 earned) may decide to work less than someone who faces a marginal tax rate of 20 percent (and would thus take home \$8 for an additional \$10 earned).

Relative to a consumption tax base, the use of an income tax base increases the costs to individuals of saving for the future, as detailed in Chapter 3 of the 2005 *Economic Report of the President*. A tax system with the property of *static efficiency* does not distort the choices that people make about how to allocate resources today (for example, it does not affect their decision about whether to consume apples or oranges). A system with the property of *dynamic efficiency* does not distort the choice of how to allocate resources between today and tomorrow (it does not affect the choice between consuming apples today and consuming apples in the future).

Consumption-based taxes are more likely to be dynamically efficient than income-based taxes. Someone earning a higher return on a savings account can expect to consume more in the future for each dollar saved, and is thus likely to save more. Taxing savings (as is done in a pure income-based system) makes future consumption relatively more costly, which leads people to save and invest less, with adverse consequences for economic growth.

Further distortions are introduced into the U.S. economy by the separate taxation of corporate income, rather than integration of taxation of corporate and personal income. Corporate profits are essentially taxed twice, first under the corporate income tax and again under the personal income tax when corporate profits are paid out as dividends. The result is a higher tax on income earned in the corporate sector than that earned elsewhere in the economy. For corporate income that is paid out as dividends, the combined tax rate can be remarkably high: as much as 35 percent at the corporate level and another 15 percent through the individual income tax, considering Federal taxes alone. Including state tax rates and accounting for deductibility, the Organization for Economic Cooperation and Development (OECD) estimates the U.S. combined tax rate can be as high as 50.8 percent. This double-taxation of corporate income creates both static and dynamic inefficiencies. It is also inconsistent with either a pure income tax base or a pure consumption tax base.

The U.S. tax code also makes it costlier for firms to make some kinds of investments than others, leading to additional distortions of economic decision making. For example, investment financed from prior earnings (equity) and investment financed from borrowing (debt) are taxed differently, various assets are subject to different depreciation rules, and dividend income received by shareholders is taxed differently from capital gains. There are also ways that U.S. firms can reduce their effective tax rate by deferring their tax payments. Each of these differences affects the choices that businesses make about where and how much to invest.

Finally, the U.S. application of a worldwide tax base affects firms' decisions about where to locate and where to make investments. Foreign-sourced income of U.S. companies is taxable, but the credits taxpayers receive for foreign taxes paid are not applied uniformly. There are limits to the amount of foreign tax credit a firm can claim, which can create incentives for firms to change their investment and business activity patterns across countries based on international tax rates. Under this worldwide system, U.S. firms operating in a foreign country may eventually be liable for not just that host country's taxes, but also for U.S. taxes under some circumstances. Competitors from countries taxing on a territorial basis are not subject to this U.S. tax, and therefore may have a competitive advantage, all else being equal.

More generally, the tax treatment of the foreign-source income of U.S. multinationals under the current worldwide system is widely thought to be one of the most complex aspects of U.S. taxation. This complexity itself imposes a burden on these companies, causing them to allocate substantial resources to tax planning and compliance. With globalization and the increasing importance of international capital flows, the distortions and complexity generated by the current U.S. system are increasingly costly to the U.S. economy.

U.S. Tax Policy in International Perspective

In this section we examine the choices the United States has made about the size of the national tax burden, the forms of taxation to employ, and the tax rates applied. We compare these choices to those made by other countries and show that the United States has a relatively low overall tax burden, and its choices about which tax sources to rely upon differ substantially. Recent reforms in other countries are highlighted.

International Comparison of Overall Tax Burdens

A common measure of the overall tax burden is the ratio of total taxes paid to all levels of government to the gross domestic product (GDP). This share represents the fraction of the total output of the economy that is taken in taxes in any given year, or the average tax rate. This measure of overall tax burden is particularly useful for international comparisons. First, it is unaffected by international differences in national versus subnational government responsibilities. Second, it adjusts for differences in the overall size of the countries' economies.

Among countries in the OECD, the United States has a relatively low total tax burden (including Federal, state, and local taxes). Total taxes in the United States at all levels of government amounted to 26.4 percent of GDP in 2002, substantially lower than the OECD average of 36.3 percent. This share is also below the European Union (EU) average of 40.6 percent.

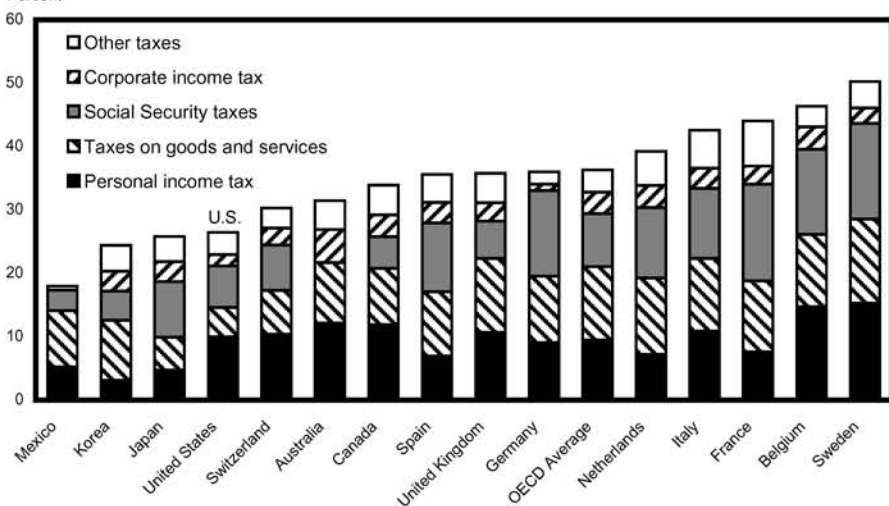
Chart 5-1 uses OECD data from 2002 to illustrate the average tax rates (total taxes as a share of GDP) for the 15 largest countries of the OECD. Only Mexico, Korea, and Japan had total tax burdens smaller than that of the United States in 2002. OECD countries such as Sweden and Denmark, on the other hand, had tax burdens that were as much as 20 percentage points of GDP higher than that of the United States.

The United States faces a significant fiscal challenge in keeping the overall tax burden low in the future. Growth in Federal entitlement spending if not checked, threatens to require substantial increases in taxes, significantly altering the tax choices the United States has made in the past. Box 5-1 provides an overview of this fiscal challenge and its implications for tax policy.

Chart 5-1 Tax Revenues as a Percent of GDP for the OECD Countries in 2002

The United States has a relatively small total tax burden and uses personal income taxes to collect a larger share of total revenue than most other countries.

Percent



Note: The countries shown have the 15 largest economies in the OECD. Mexico's personal and corporate tax revenues are combined, as they were not available separately.

Source: Organization for Economic Cooperation and Development.

International Comparison of Tax Bases and Rate Structures

Beyond different choices about the scope and size of government, the OECD countries have also made different choices about the tax systems used to raise funds. Almost all of the OECD countries use some mix of personal income, corporate income, payroll, sales, and other taxes (e.g., estate and excise taxes), but they differ significantly in their degree of reliance on each. Chart 5-1 illustrates the composition of each country's tax revenue sources: personal income taxes, taxes on goods and services (consumption taxes), social security taxes, corporate income taxes, and other taxes.

The United States relies more heavily on personal income taxation than other OECD countries do. Indeed, in 2002 the United States collected 37.7 percent of its total taxes through the personal income tax compared to an OECD average of 26.0 percent. Given this difference, one might then ask how other countries finance their spending. The primary alternative tax base is consumption. OECD countries collected an average of 31.9 percent of total revenues from taxes on goods and services, mainly through value-added taxes (VATs). A VAT is a tax applied to the gross receipts earned by sellers of products, but sellers receive a tax credit for taxes paid on the inputs they use, so the tax effectively applies only to the value that they themselves added in the

Box 5-1: Fiscal Challenges Ahead

U.S. Federal tax revenues and Federal expenditures have remained fairly stable as a share of national output (GDP) over the past four decades. Despite this overall stability, substantial changes have occurred in the composition of both revenues and expenditures. These expenditure trends in particular foreshadow a major fiscal challenge facing the United States.

Total Federal revenues have averaged 18.2 percent of GDP since the 1960s, with only modest variation around that average, although the composition of revenues has shifted toward payroll taxes and away from excise and corporate income taxes. As discussed in this chapter, the income tax base and rates have changed many times during this period, but the overall contribution of income taxes to total revenues has been fairly stable.

Total Federal outlays since the 1960s have also remained close to the long-run average of about 20.4 percent of GDP, despite many changes in the economy and the mix of government programs that have occurred since 1962. This stability masks important underlying trends, however, in the composition of expenditures. The share of GDP and of the government's budget allocated to spending on Medicare, Medicaid, and Social Security has risen steadily, while the share devoted to defense has fallen. If the growth of spending on these programs goes unchecked, there will soon be a major break in the generally stable fiscal situation that the United States has enjoyed for most of the postwar period.

The cost to the Federal government of these three entitlement programs is expected to rise from 8.0 percent of GDP today to about 15.6 percent of GDP in 2045. In 2005, all other spending programs of the Federal government, excluding interest payments on the national debt, amounted to 9.0 percent of GDP. With this growth, and other programs remaining constant as a share of GDP, in 2045 the Federal budget excluding interest on the debt will consume 24.6 percent of the GDP, compared to 17.0 percent today, with continuing increases beyond that date. Adding back interest on the national debt could make the share of GDP absorbed by the Federal budget even larger.

The implications of these trends are grave. If the major entitlement programs grow as forecast, future generations will be forced to choose between massive tax increases, near-elimination of all government programs outside of entitlements (including defense and essential services), or some combination.

making of the product. Only 17.6 percent of U.S. tax revenues came from taxes on goods and services in 2002, primarily through state and local sales and excise taxes. Recall, however, that the personal income tax is actually a hybrid income-consumption tax, so that some of the taxes collected through the U.S. income tax system, and those of other countries, might be thought of as taxes on consumption.

The United States has also made different choices about the marginal tax rate structure to impose on its tax base. Chart 5-2 shows the top marginal personal income and corporate income tax rates in various OECD countries, including the 15 largest OECD economies and Ireland. The black bars illustrate the personal rate and the gray bars illustrate the corporate rate. The chart shows the OECD's "all-in" definition of the top rate, which includes taxes collected by all levels of government and the employee portion of the social security tax. The top marginal personal income tax rate of 43 percent in the United States is comparable to that of several of the OECD countries such as the United Kingdom (41 percent), and slightly lower than those in France (47 percent) and Japan (48 percent), which matches the OECD average (48 percent), and significantly below the rates in Germany and the Scandinavian countries (all 55 percent or higher). At the same time, the United States has a combined (Federal and state) marginal corporate income tax rate of 39 percent, well above the OECD average of 30 percent, and second highest to that of Japan.

Chart 5-2 illustrates several important points. First, while the U.S. top individual income tax rate is comparable to those of other OECD countries, its top corporate rate is relatively high. Second, except for Mexico, each country's top personal rate is higher than its top corporate rate. Third, there is no clear correlation between the top personal and corporate tax rates. Ireland, for example, has a moderately high personal rate but a very low corporate rate, while Germany has high rates in both cases.

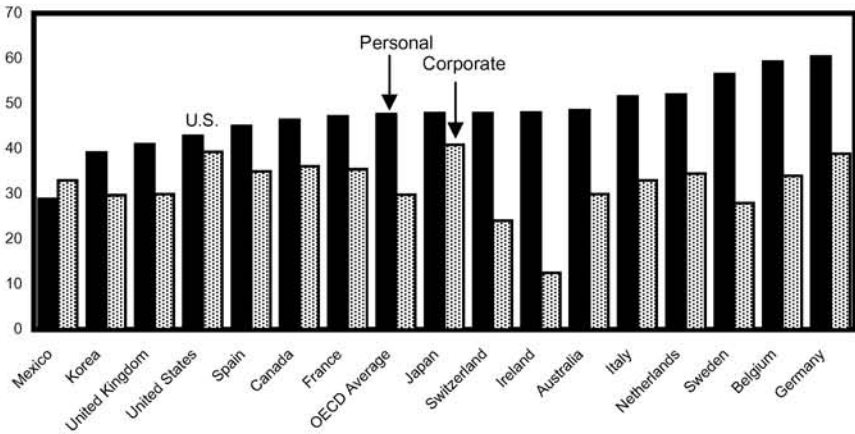
The United States has also chosen to tax on a worldwide basis, as discussed above, unlike some other countries. In 2003, 13 of 30 OECD countries taxed on a worldwide basis, including Japan, Korea, Mexico, and the United Kingdom. The majority of OECD countries (17 countries in 2003) tax on a territorial basis, including Canada, France, Germany, Ireland, Netherlands, Spain, and Sweden.

Finally, the United States has made different choices about the integration of personal and corporate income tax structures. The United States uses a *classical system*, which taxes corporate and personal income separately, based on the status of corporations as separate legal entities. This results in the double taxation of income earned in the corporate sector. Other countries using this system include Ireland, Sweden, and Switzerland. Alternatives to the classical system provide some form of dividend tax relief, thereby avoiding

Chart 5-2 **Top Marginal Personal and Corporate Tax Rates for the OECD Countries in 2004**

The United States has a relatively high top corporate tax rate and a moderately low personal income tax rate in comparison with other large economies in the OECD.

Percent



Note: The countries shown include the 15 largest OECD economies plus Ireland, which is interesting because of its relatively low corporate tax rate. The personal rates are the OECD's "all-in" (top marginal) tax rates, which are calculated as the additional central and subcentral government personal income tax, plus employee social security contribution, resulting from a unit increase in gross wage earnings. The corporate rates are the OECD's top combined central and subcentral government rates, with the deductibility of subcentral government taxes taken into account.

Source: Organization for Economic Cooperation and Development.

or reducing double taxation. Under the *imputation system*, shareholders are given a personal income tax credit for tax paid by the corporation on that portion of its profit. Countries using imputation systems (wholly or partially) include Australia, New Zealand, Norway, Canada, and the United Kingdom. Another alternative is the *dividend exclusion method*, under which a portion of dividends paid to individuals is excluded from tax at the individual level. Countries using this method include Germany, France, Finland, and Italy. A final method that can be used to avoid double taxation of dividend income is to apply a *two-rate system*. Under this approach, distributed corporate profits (paid out in dividends) and undistributed profits are taxed at two different rates with undistributed profits taxed at a higher rate. The extent to which this approach eliminates the double taxation of dividend income depends on the rates chosen.

Recent International Tax Reforms

We begin by reviewing several common trends in recent tax reforms that have been adopted by a diverse set of nations. We then examine the implications of these reforms for international tax competition and for reform of the U.S. system.

International Tax Reform Trends

According to the OECD, most countries making changes in their tax systems since 1999 have lowered personal and corporate income tax rates. Those rate reductions were often financed, at least in part, by base broadening. Within this overall pattern of lower personal and corporate income tax rates, there are four discernible trends.

One clear trend among OECD countries is *reducing the taxation of wage and salary income*. These taxes have been reduced through both rate reductions and increases in taxable income thresholds. The OECD average “all in” tax rate for a full-time production worker fell from 25.6 percent in 2000 to 24.8 percent in 2003. The corresponding marginal tax rate fell from 35.4 percent to 34.3 percent. Among G-8 countries since the year 2000, France, Germany, Japan, Russia, and the United States have all lowered personal income tax rates that apply to wage and salary income. Changes in the tax brackets and rate structures generally made these tax systems less progressive, although accompanying changes in exemptions, deductions, and credits complicate the distributional picture.

A second trend is *reducing the tax rates applied to corporate income*. The OECD average corporate income tax rate fell from 33.6 percent in 2000 to 30.8 percent in 2003. As in the case of wage and salary taxation, these rate reductions have typically been accompanied by base-broadening measures. Since 1999, the G-8 countries of France, Germany, Italy, and Japan all reduced their corporate tax rates.

A third trend is *reducing the taxation of capital income* (especially capital gains and dividends) under the personal income tax. Top marginal tax rates on dividend income (corporate plus personal) fell over the period 2000-2003 among OECD countries from 50.1 percent to 46.4 percent. Reforms in Italy, Japan, and the United States, in particular, all reduced the personal income tax rates applied to interest, dividends, or capital gains. Six of the G-8 countries have also altered their tax systems to better coordinate their personal and corporate income taxes. Several countries of the EU, including France, Germany, and Italy, applied partial dividend exclusions, and Russia lowered its dividend tax rate.

A fourth trend is the increasing popularity of *flat rate* income tax schedules. Since the mid-1990s, eight Eastern European countries, including Russia, have adopted income taxes with flat rate structures. The personal tax rates among these eight reform countries range from a low of 12 percent in Georgia to a high of 33 percent in Lithuania, and average 20.6 percent. On the corporate income side, the tax rates range from a low of 10 percent in Serbia to a high of 24 percent in both Estonia and Russia, and average 17.9 percent. Countries adopting these flat income tax structures tend to also apply value-added taxes at relatively high rates, typically 18%.

Evidence on International Tax Competition

Evaluating the U.S. tax system in relation to other national tax systems is particularly important in a world where nations compete for business and mobile capital (including physical, financial, and human capital) by making their tax systems more attractive. A recent review of evidence on international tax competition suggests a systematic change in the pattern of tax rate setting. From 1982 to 1999, there was a substantial increase in international capital mobility, reflected in the amount of foreign direct investment (purchase of buildings, machinery, and equipment) and other measures of the flow of international capital. At the same time, statutory corporate tax rates (tax rates established in the law) declined all around the world and corporate tax bases were broadened, resulting in little change in effective average rates. An exception to that general rule is that effective tax rates for foreign subsidiaries of U.S. firms located in small countries fell sharply between 1992 and 2000.

While the United States reduced its top combined corporate tax rate from 50 percent in 1982 to 39 percent in 2005, as measured by the Institute for Fiscal Studies, other countries have made even more significant reductions. The United States now has the second highest combined corporate income tax rate among OECD countries, behind only Japan. With international tax rates falling overall, and a convergence between rates applied by large and small countries, the United States risks becoming less competitive in attracting capital. As capital becomes more mobile, it is increasingly easy for companies to move their productive activities, including physical capital, export/import operations, research and development activities, and other forms of knowledge creation, around the world in response to tax incentives. (Chapter 7, *The History and Future of International Trade*, discusses the role of global engagement in firm performance.) In the current environment of international tax competition, the United States will be increasingly challenged as the destination of choice for internationally mobile capital and jobs.

U.S. Tax Reforms: Past, Present, and Future

Reform of the U.S. tax system can play a critical role in improving economic efficiency and the competitiveness of U.S. firms. In this section, we examine past tax-reform efforts in the United States, starting with the Tax Reform Act of 1986 (TRA86), and project potential future reforms. We focus in particular on reform of the U.S. tax base and on the taxation of savings or the return to savings, such as interest, dividends, and capital gains.

Twenty Years of Tax Reform

The U.S. tax code has many provisions that give preferential treatment to certain types of income. In some instances, these preferences may improve efficiency, such as incentives to increase retirement saving or investment in new equipment that offset distortions introduced by the income tax system. In other cases, tax preferences intentionally distort economic decisions in order to promote certain kinds of economic activity, such as the introduction of tax credits that subsidize advanced education, labor market participation, research and experimentation, or the employment of disadvantaged workers. These provisions narrow the tax base and result in higher marginal tax rates for at least some taxpayers. They also add complexity to the tax code. The President's Advisory Panel on Federal Tax Reform illustrated the trade-off between tax rates and the tax base in the current U.S. tax system. Their calculations suggest that with a broader tax base, tax rates in all tax brackets could be reduced by about a third. Multiple changes to the tax base in the last two decades reflect this tension.

The Effect of Recent Reforms on the Tax Base

We have ample evidence from the last two decades that tax policy is always evolving. The last comprehensive U.S. tax reform was the Tax Reform Act of 1986. That reform was revenue-neutral, broadening income tax bases and lowering marginal tax rates dramatically. TRA86 actually built on reductions in marginal tax rates that began in 1981 when the top rate was reduced from 70 percent to 50 percent. Under the base-broadening provisions of TRA86, marginal tax rates were reduced further, with the top rate cut to 28 percent. Rates applied to different types of income were also made more uniform. For example, one study estimated that effective capital tax rates (taking into account depreciation schedules and other tax provisions that differ across types of capital) prior to TRA86 ranged from a 45.6 percent tax on income from industrial buildings to a 3.3 percent subsidy of income from general industrial machinery. After TRA86 those effective tax rates converged to 37 percent and 38 percent, respectively. Leveling the playing field in this way reduces the distortions to investment across various forms of capital. While TRA86 made effective tax rates more similar across types of capital income, it also raised the overall cost of capital, which likely discouraged investment and reduced dynamic efficiency.

Since TRA86, there have been more than 100 different acts of Congress making nearly 15,000 changes to the tax code. These changes have altered both the individual and the corporate tax bases. Some changes have narrowed

the tax base (such as the 1997 repeal of the Alternative Minimum Tax for small business and the 2001 increase in the standard deduction for joint filers), while others have broadened it (such as the 1990 and 1993 limits on itemized deductions and the 1993 expansion of the taxability of Social Security benefits). Other reforms have changed the tax rates applied to this base, such as the rate reductions enacted in 2001 and accelerated in 2003. The introduction and expansion of numerous tax credits, such as the Child, HOPE, Lifetime Learning, Welfare to Work, and Renewal Communities credits, have narrowed the base and introduced disparities in tax rates applied to different types of income.

Disparities in effective marginal tax rates on capital are once again quite large, varying with the method by which capital is financed and by the type of asset. A recent study finds that the effective tax rate on corporations ranges between a tax of 36.1 percent on equity-financed activity to a subsidy of 6.4 percent of debt-financed activity. Furthermore, that study finds that the effective marginal tax rate varies from a high of 36.9 percent to a low of 9.2 percent, depending on the asset type. The current piecemeal tax system is thus both complex and inefficient. In the following section, we examine potential reforms to address these issues.

Potential Reforms to the Tax System

The increasingly globalized business environment in which U.S. investors and firms operate makes the design of an efficient and competitive tax system particularly crucial. Two central issues in the current tax reform debate are the choice of tax base along the income-consumption spectrum and the coordination of personal and corporate tax rates. Recent U.S. tax reforms have lowered the tax rates on capital income. Comprehensive reform could uniformly lower the level of capital income taxation, and could thus reduce the distortions of the current tax system and support greater potential economic growth.

Comprehensive Business Taxation

One shortcoming of the U.S. tax system, discussed above, is the double taxation of corporate income, which subjects capital income to a high effective rate. Since 2003, the United States has taken steps to reduce this problem by applying a substantially lower (15 percent) individual tax rate to dividend and capital gains income, thereby implicitly applying a two-rate system. The President has recommended making permanent these lower tax rates on capital.

Over the years, several comprehensive reforms to integrate corporate and personal income taxes have been proposed. The Treasury Department developed a proposal for a Comprehensive Business Income Tax (CBIT) in the 1990s. The proposed system was designed to give equal tax treatment to

corporate debt and equity, tax corporate and noncorporate businesses alike, and reduce the tax distortions between retained and distributed earnings. The CBIT still provides a relevant prototype for integration within the context of an income tax system. Alternatives have also been proposed that move away from reliance on an income tax by implementing a cash-flow business tax (see Box 5-2, for example).

Box 5-2: *Simple, Fair, and Pro-Growth: Proposals to Fix America's Tax System*

Recommendations of the President's Advisory Panel on Federal Tax Reform

The President's Advisory Panel on Federal Tax Reform was charged with evaluating the current Federal tax system and developing alternatives that achieved improvements in simplicity, fairness, and growth potential. They were asked to make at least one recommendation based on the current income tax system, to make their recommendations revenue-neutral, and to preserve incentives for charitable giving and home ownership. In addition, the panel chose to design their recommendations to preserve the current distribution of tax burden. Their 2005 report recommends two alternatives to the present income tax system: a Simplified Income Tax (SIT) and a Growth and Investment Tax (GIT). The SIT plan is a simplified version of the current income tax system. The GIT plan moves to a modified consumption tax that retains some income tax elements.

These two proposals have several features in common. They both have fewer tax brackets and lower top marginal tax rates for individuals and families than the current system. Both plans would repeal the Alternative Minimum Tax (AMT) for families and corporations. Both simplify the tax treatment of savings and lower the tax burden on productivity-enhancing investments by businesses. Either plan would be substantially simpler than the present tax system, and both plans maintain the present distribution of tax burden across income groups.

The two plans diverge primarily in their taxation of business and capital income, using different bases for business taxation. The SIT plan retains a simplified income tax applied to corporations, while the GIT plan would apply a cash-flow tax to all businesses (not just corporations). While they both lower the effective tax rate on capital income, they use different approaches to do so. The SIT plan excludes dividends paid to individuals from the individual income tax base and excludes 75 percent

Box 5-2 — *continued*

of corporate capital gains from U.S. companies, while the GIT plan applies a uniform 15 percent tax to interest, dividends, and capital gains at the individual level. The SIT plan adopts a simple accelerated depreciation method for investments, while the GIT plan would permit full expensing of investment. The plans also tax foreign income differently. The SIT plan taxes income on a territorial basis (with foreign-sourced income untaxed), while the GIT cash-flow tax is destination-based (with exports untaxed).

Either of these two recommendations represents a significant step forward in making the U.S. tax system simpler, fairer, and growth-enhancing, but each would involve substantial transition costs. They deserve serious consideration and more comprehensive analysis.

The President's Tax Reform Panel

The broader goals of any comprehensive tax reform should be the creation of a system that is simple, is fair, and promotes economic growth. The President's Tax Reform Panel sought to design revenue-neutral and distribution-neutral plans to achieve these goals. The panel proposed two prototypes for reform: a Simplified Income Tax (SIT) and a Growth and Investment Tax (GIT), summarized in Box 5-2. Both of these proposals fundamentally alter the tax bases for individuals and businesses as well as the treatment of capital income. Either of these reforms would represent a large change and involve important transition issues. While each plan embodies features that are attractive from the point of view of efficiency, fairness, and simplicity, comprehensive review of these plans and policy debate is needed before making such substantial changes to the tax system.

Conclusion

Every government faces choices about how to design its tax system in order to finance the services it provides for its citizens. Because virtually all forms of taxation distort economic decision making, each country faces the challenge of designing a tax system that raises needed revenue and achieves distributional and other goals while distorting economic decisions as little as possible. By taking into account the effects of tax rules on the economic behavior of individuals and firms, governments can provide a tax environment that fosters the most-efficient allocation of resources and the best economic performance possible.

The United States has chosen to impose an overall tax burden that is low relative to most other industrial countries and to rely most heavily on the personal income tax. Governments of other advanced economies rely less on personal income taxation and more on consumption taxes, such as value-added taxes, in order to finance a larger public sector. Given the U.S. reliance on the personal income tax, we face the continuing challenge of keeping the income tax base broad and the rates low in order to keep the economic burden of taxation as small as possible.

Global tax reforms have changed the tax landscape substantially in recent years. Other advanced economies have generally reduced taxes on wage and salary income, reduced taxes on capital income under the personal income tax (in particular, capital gains and dividends), and reduced taxes on corporate income. While our personal income tax rates are comparable to those of other countries, our corporate tax rate is now the second highest among OECD countries. These international differences could endanger the ability of the U.S. economy to attract capital in a world where capital is increasingly mobile. Any reform of the U.S. tax system should aim to improve the performance of the U.S. economy and to spread the burden of financing government spending simply and fairly.

The U.S. Capital Account Surplus

The United States conducts a large number of trade and financial transactions with other countries. These transactions are recorded in the U.S. balance of payments accounts. The *balance of payments* consists of two subaccounts. One subaccount is the *current account*. The current account consists largely of the trade balance, which records U.S. imports and exports of goods and services. The second subaccount is the *capital and financial account* (hereafter called the capital account), which records U.S. net sales or purchases of assets—stocks, bonds, loans, foreign direct investment (FDI), and reserves—with other countries during the same time period.

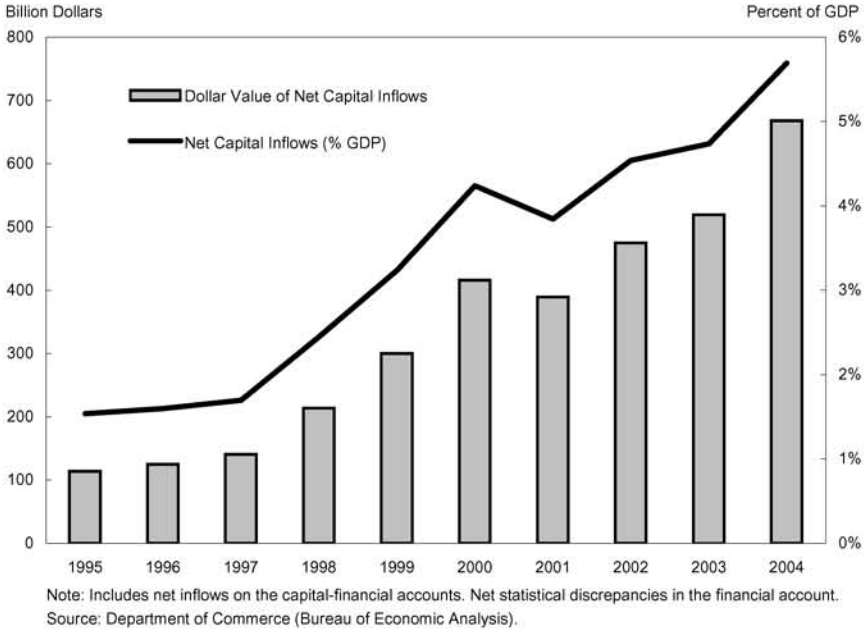
In 2004 (the most recent calendar year for which data exist), the United States ran a *current account deficit* of \$668 billion. This deficit meant the United States imported more goods and services than it exported. The counterpart to the U.S. current account deficit was a U.S. *capital account surplus*. This surplus meant that foreign investors purchased more U.S. assets than U.S. investors purchased in foreign assets, investing more in the United States than the United States invested abroad. By economic definition, a country's current and capital account balances must offset one another. Therefore, the U.S. current account deficit was matched by a capital account surplus of \$668 billion (including \$85 billion in net statistical discrepancies within the capital account, which are included in part to ensure the accounts sum to zero).

Because foreigners invested more in the United States than the United States invested abroad, the United States received *net foreign capital and financial inflows* (hereafter called net capital inflows). Countries like the United States that run capital account surpluses and current account deficits receive net foreign capital inflows. In contrast, countries that run capital account deficits and current account surpluses experience net foreign capital outflows.

Between 1980 and 2004, the United States ran a capital account surplus and a current account deficit in all but three years. More recently, net capital inflows to the United States have risen sharply (Chart 6-1). The \$668 billion in net inflows received in 2004 was nearly \$300 billion greater than the level of net inflows received only three years earlier. As a percent of U.S. Gross Domestic Product (GDP), net capital inflows rose from 1.5 percent in 1995 to 4.2 percent in 2000 to 5.7 percent in 2004. In 2005, U.S. net capital inflows are likely to have exceeded 6 percent of GDP and ranged from \$700 to \$800 billion in dollar terms.

Chart 6-1 Net Capital Inflows to the United States

Net U.S. inflows have risen in recent years in absolute terms and as a percent of GDP.



Recent growth in U.S. net capital inflows has sparked debate about the causes of these inflows. As this chapter discusses, a variety of factors explain recent trends in U.S. capital inflows. One of these factors is the pattern of *national saving* (hereafter called domestic saving) and *domestic investment* in the United States and other countries. This perspective on foreign capital flows—linking domestic saving and investment balances—is consistent with, but somewhat different from, analyses that explain U.S. capital inflows by focusing narrowly and exclusively on the U.S. trade deficit. In a view that emphasizes trade flows, U.S. net capital inflows result directly from the excess of U.S. imports over U.S. exports. In contrast, a view that emphasizes domestic saving and investment balances highlights a wider range of factors within countries that can lead them to experience net capital inflows or outflows. Key points of this chapter are:

- The size and persistence of U.S. net capital inflows reflects a number of U.S. economic strengths (such as its high growth rate and globally competitive economy) as well as some shortcomings (such as its low rate of domestic saving).

- The recent rise in U.S. net capital inflows between 2002 and 2004 in part reflects global economic conditions (such as a large increase in crude oil prices) as well as policies (such as China's exchange rate policy) and weak growth in several other large economies (such as Germany) that led to greater net capital outflows from these countries.
- The United States is likely to remain a net foreign capital recipient for a long time. However, the magnitude of future U.S. net capital inflows is likely to moderate from levels observed in recent years.
- Encouraging greater global balance of capital flows would be helped by steps in several countries. The United States should raise its domestic saving rate. Europe and Japan should improve their growth performance and become more attractive investment destinations. Greater exchange rate flexibility in Asia, including China, and financial sector reforms could increase the role of domestic demand in promoting that region's future growth.

In addition, the chapter makes two broader points. First, global capital flows—the flow of saving and investment among countries—should be analyzed from a global perspective and not by considering U.S. economic policies alone. Global capital flows are *jointly* determined by the behavior of many countries. To understand why the United States receives large net capital inflows requires understanding why countries like Japan, Germany, China, and Russia experience large net capital outflows.

A second point is the need to distinguish between market-driven and policy-driven capital flows. For example, recent capital outflows from Germany have largely reflected market forces and private sector behavior. In contrast, China's recent net capital outflows largely reflect policy decisions. In the United States, capital inflows have reflected a combination of market forces and policy behavior. Separating market from policy-related sources of capital flows is important for understanding capital flow patterns and to consider how these flows may change in the future.

This chapter is structured in five parts. The first part explains the distinction between countries that are net capital importers (receiving net capital inflows) and countries that are net capital exporters (experiencing net capital outflows). One key theme is the link that exists between saving and investment balances *within* countries and capital flows *among* countries. The second part of the chapter examines recent trends in global capital flows. Next, the chapter examines four countries that were the world's largest net capital exporters in 2004—Japan, Germany, China, and Russia—to understand some of the factors driving their capital outflows. The chapter then examines recent U.S. capital inflows and their determinants. The final section discusses whether the United States can continue receiving net capital inflows indefinitely.

Global Capital Flows—Principles

Global capital flows reflect the matching of saving and investment opportunities in the global financial system. In any given period, countries can be classified as net capital exporters or net capital importers. Net capital exporters have supplies of domestic saving (which includes households, firms, and the government) that exceed domestic investment opportunities that are expected to be profitable. Because of their excess saving, these countries export some portion of their saving to other countries through net purchases of foreign assets—stocks, bonds, loans, FDI outflows, and reserves. In contrast, countries that are net capital importers have more domestic investment opportunities that are expected to be profitable than they can fund with their supply of domestic saving. These countries have excess demand for saving and import foreign saving through net sales of assets to foreign investors. Broadly speaking, therefore, global capital flows reflect the interaction between countries that are net capital importers and net capital exporters.

Stated differently, countries that are net capital exporters run *capital account deficits* and *current account surpluses*. Conversely, countries that are net capital importers run *capital account surpluses* and *current account deficits*. A country's capital account balance reflects its net sales or purchases of assets with other countries. Its current account balance reflects its net sales or purchases of goods and services with other countries along with net flows of income and transfer payments. The current account and capital account must exactly offset one another. This means the value of a current account surplus will be mirrored by the value of a capital account deficit, and a current account deficit will be mirrored by a capital account surplus of equal value.

Capital flows provide benefits to both groups of countries. For capital exporters, net outflows allow them to earn a higher return on their savings by investing abroad than they expect to earn by investing in their own countries. For capital importers, drawing on foreign savings allows domestic investment to be maintained at a higher level than would otherwise be possible given their level of domestic saving. Maintaining a high level of capital investment is critical for promoting future growth.

Changes in the rate of domestic saving or domestic investment will cause changes in a country's capital and current account balances. For example, a rise in domestic investment relative to saving will, all else equal, cause the capital account surplus to rise and the current account balance to fall. In this case, net capital inflows will increase (or, for countries already experiencing net capital outflows, net outflows will decrease). Conversely, an increase in domestic saving relative to investment will cause the capital account balance to decrease and the current account balance to increase. In that case, net foreign capital outflows will increase (or net capital inflows will decrease). Therefore, one way

of assessing changes in current and capital account balances is to examine changes in domestic saving and investment rates (see Box 6-1).

Box 6-1: Analyzing the Current and Capital Account Balances

There are two ways to analyze the current account balance. The more widely used perspective measures a country's imports and exports of goods, services, net income flows, and net current transfer payments. Net capital flows, which are recorded in the capital account, reflect financing from foreigners needed to pay for net import purchases on the current account. By accounting necessity, the current account and capital account must sum to zero. Therefore, a current account deficit will be matched by a capital account surplus of equal magnitude.

The table below shows the U.S. current and capital accounts in 2004. The current account deficit of \$668 billion was offset by an equivalent capital account surplus (including net statistical discrepancies, previously noted). Line items within the capital account specify the ways that foreigners invested in the United States. The largest net capital inflow component was portfolio investment (\$763 billion in gross inflows and \$103 billion in gross outflows, equaling \$660 billion in net inflows). Because the United States has a floating exchange rate, changes in its official reserve assets were small. For countries with fixed exchange rates, changes in reserves are typically much larger because reserves are bought or sold through foreign exchange intervention that is undertaken to manage the value of their exchange rate.

Current Account (billion dollars)		Capital Account (billion dollars)	
Goods	- \$665	Net capital transfers	- \$2
Services	+ \$48	Net foreign direct investment	- \$145
Net income	+ \$30	Net portfolio investment	+ \$660
Net current transfers	- \$81	Net banking and other flows	+ \$67
Total	- \$668	Net statistical discrepancies	+ \$85
		Net change in official reserve assets	+ \$3
		Total	+ \$668

Source: Bureau of Economic Analysis, International Monetary Fund, International Financial Statistics

Another perspective on the current account compares domestic saving with domestic investment. When domestic investment exceeds domestic saving, a country has excess demand for saving that is met by drawing on other countries' saving. Foreign capital inflows may reflect expectations by foreign investors that they will realize a higher

Box 6-1 — continued

return by investing in other countries than they will earn by investing in their own countries. In this case, capital inflows broadly reflect the attractiveness of investing in one economy relative to other economies.

The table below shows U.S. domestic saving and domestic investment in 2004. Because domestic investment exceeded saving, a current account deficit and capital account surplus resulted. The total sums to the same amount regardless of whether the current account is looked at through trade flows or through saving and investment flows.

U.S. Savings and Investment—2004 (billion dollars)

Gross domestic saving	+ \$1,572
Gross domestic investment	+ \$2,301
Net other flows	+ \$61
Total	\$ 668

Source: Bureau of Economic Analysis

Global Capital Flows—Recent Patterns

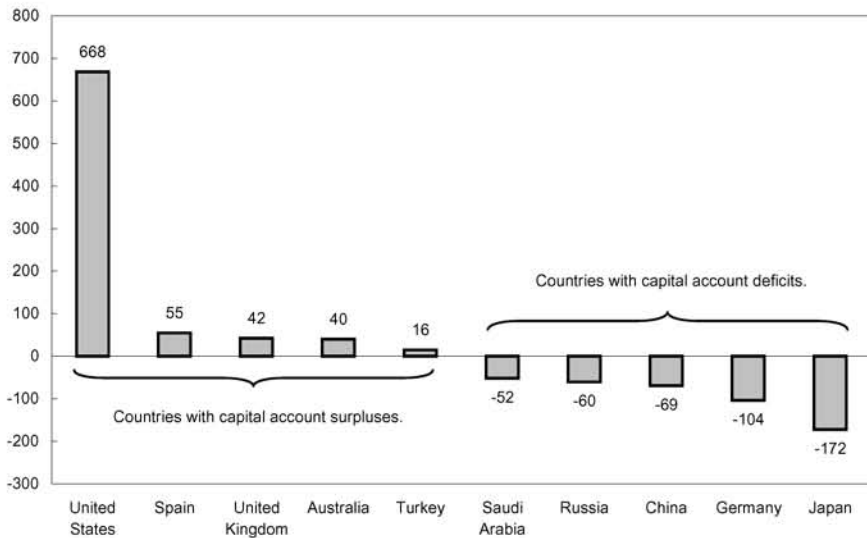
What is the current pattern of net capital inflows and outflows across countries? How has this pattern changed in the past decade? Chart 6-2 shows the United States was the largest net capital recipient in 2004. Spain, Great Britain, Australia, and Turkey were also net capital recipients. Japan, Germany, China, Russia, and Saudi Arabia were the largest net capital exporters.

Between 1995 and 2004, global saving and investment patterns changed in a number of respects. Some of the more important changes were:

- *Declining concentration among net capital exporting countries.* Falling concentration means that a wider range of countries experienced net capital outflows. In 1995, the world’s largest net capital exporter (Japan) accounted for 39 percent of global net capital outflows and the five largest net capital exporters accounted for 70 percent of net outflows. In 2000, the largest net capital exporter accounted for 24 percent of net outflows while the five largest net exporters accounted for 48 percent of net outflows. In 2004, the largest net exporter accounted for 20 percent of net outflows while the five largest net exporters accounted for 52 percent of net outflows.
- *Rising concentration among net capital importing countries.* Rising concentration means that a smaller number of countries received a larger

Chart 6-2 Largest Net Capital Importers and Exporters- 2004

The United States had the largest net capital inflows in dollar terms and Japan had the largest net capital outflows. Billion Dollars



Note: Assumes net statistical discrepancies are in the capital and financial accounts.

Source: International Monetary Fund, *World Economic Outlook*, September 2005.

share of total net capital inflows. Most of this change reflected higher U.S. net capital inflows. The United States received 33 percent of global net capital inflows in 1995, 61 percent in 2000, and 70 percent in 2004. The five largest net capital recipients received 57 percent of global net capital inflows in 1995, 78 percent in 2000, and 86 percent in 2004.

- *A change in net capital flow positions for some large countries.* Germany experienced the largest change in its net capital flow position. In 1995 and 2000, Germany received \$30 billion in net capital inflows but had \$104 billion in net outflows in 2004. Saudi Arabia also went from small net capital inflows in 1995 (\$5 billion) to large net capital outflows in 2004 (\$52 billion).
- *A change in the regional composition of capital flows.* Developing Asian and Middle Eastern countries also became large net capital exporters. In 1995, developing Asian countries had net inflows of \$42 billion, but had net outflows of \$93 billion in 2004. China had \$2 billion of net capital outflows in 1995, \$21 billion of net outflows in 2000, and \$69 billion in net outflows in 2004. Rising crude oil prices also caused many oil-producing countries to become large net capital exporters. Middle Eastern countries had net capital inflows of \$1 billion in 1995 and \$103 billion of net outflows in 2004.

- *Net capital outflows from developing countries.* In 1995, developing and emerging market countries as a whole received \$84 billion in net capital inflows. In 2000, they experienced \$91 billion in net outflows. In 2004, they experienced \$367 billion in net outflows. While these countries remained net recipients of foreign direct investment (FDI) inflows, they became large net purchasers of foreign reserve assets. These purchases, made primarily by central banks, represent a capital outflow because domestic resources are being invested abroad rather than within these countries.
- *Rising global foreign reserve levels.* The value of global foreign reserves (held primarily by central banks) rose from roughly \$1.5 trillion to \$3.9 trillion between 1995 and 2004—a 160 percent increase in a period when the value of global GDP increased by roughly 40 percent. Global reserves increased by more than \$1.3 trillion in 2002-04 alone. Three countries accounted for nearly 60 percent of this reserve increase—Japan, China, and South Korea.

Global Capital Exporters

To understand global capital flow patterns, we can examine in more detail saving and investment patterns in some of the largest capital importers and exporters. The world's four largest net capital exporters in 2004 were Japan, Germany, China, and Russia. In total, these countries exported more than \$400 billion of domestic savings to other countries through their net purchases of foreign assets. Net capital outflows from these four countries represented 46 percent of outflows among all net capital exporting countries in 2004.

While these countries exported large amounts of their saving to other countries, they also differed in several respects. Recent capital outflows from Japan and Germany, for example, have been associated with weak growth while Russia and China have experienced rapid growth. Germany's capital outflows largely reflect private sector, market-driven behavior whereas China's outflows reflect policy behavior. Japan and Germany have run fiscal deficits while Russia has had a fiscal surplus. Japan and Germany have had falling rates of domestic investment while China has had a rising rate. What these countries have had in common, however, were supplies of domestic saving that exceeded their domestic investment.

Japan—Deflation and a Falling Investment Rate

With net capital outflows of \$172 billion, Japan was the world's largest net capital exporter in 2004. Between 1995 and 2004, Japan was the world's

largest net capital exporter every year, “pushing” more than \$1.1 trillion in excess saving into the global financial system. Moreover, the level of Japan’s net capital outflows increased each year from 2001 to 2004.

Recent growth in Japan’s net capital outflows has resulted primarily from a falling domestic investment rate rather than a higher saving rate. Between 1995 and 2004, Japan’s domestic saving rate fell from 30 percent to 28 percent of GDP. During this same period, Japan’s domestic investment rate fell from 28 percent to 24 percent of GDP. This widening gap between saving and investment—Japan’s excess supply of saving—led to higher net capital outflows and a corresponding rise in its current account surplus. Japan’s current account surplus rose from 2.1 percent of GDP in 1995 to 2.5 percent of GDP in 2000 to 3.7 percent of GDP in 2004.

Japan’s investment rate has fallen for several reasons. A declining population and slowing growth in its labor force has reduced Japan’s need for physical capital. Japan also arguably suffered from a large excess of capital investment in the late 1980s. This previous experience with overinvestment, growth in bad loans among Japan’s banks, and the slow growth Japan has experienced since the early 1990s following the collapse of its “bubble economy” have made Japanese firms more cautious about undertaking new domestic investment. Deflationary pressures (a decline in the overall price level) have also weakened private investment since firms are often more reluctant to initiate new investment when future prices are expected to fall.

The key source of Japan’s rising saving-investment imbalance has been its corporate sector. Between 1995 and 2004, Japan’s corporate sector went from being a net borrower of funds (investing more than it saved) between 2 percent to 3 percent of GDP to a net lender of funds (saving more than it invested) equivalent to nearly 15 percent of GDP. During this same period, the rate of net saving in Japan’s household sector fell by roughly 70 percent (from 10 percent to about 3 percent of GDP) while Japan’s public sector was a large net borrower of funds. Therefore, rising net savings by Japanese firms explain much of the recent growth in Japan’s net capital outflows.

After a long period of slow growth, Japan’s economy showed some signs of improvement in 2005. Financial ratios among firms improved, and growth prospects appeared to improve. Japan’s central bank forecast that deflation is likely to end in 2006. Business confidence strengthened and commercial bank lending began to resume. Japan’s labor market also showed some signs of strength. The re-election of Prime Minister Koizumi strengthened prospects for future economic reform. To the extent Japan can achieve sustained growth, its future net capital outflows are likely to slow. Stronger growth in Japan will encourage a larger share of its savings to remain at home rather than being invested abroad.

Germany—Structural Rigidities and a Falling Investment Rate

With \$103 billion in net capital outflows, Germany was the world's second largest net capital exporter in 2004. Between 1990 and 2000, Germany received total net foreign capital inflows of \$175 billion. Between 2001 and 2004, in contrast, Germany experienced net capital outflows of more than \$200 billion. Germany's rising net capital outflows have been mirrored by its rising current account surpluses. Between 2001 and 2004, Germany's current account surplus rose from 0.2 percent to 3.8 percent of GDP.

Like Japan, Germany's rising saving surpluses and net capital outflows have stemmed from a falling rate of domestic investment rather than a rising rate of domestic saving. At 21 percent of GDP, Germany's saving rate has been broadly stable over most of the past decade (though it did rise from 2003 to 2004). Domestic investment during this period, however, fell from 22 percent to 17 percent of GDP—the second lowest investment rate among G8 countries (the world's most advanced economies).

Why has Germany's investment rate declined? One factor has been structural rigidities in its economy that have slowed Germany's rate of growth and opportunities for profitable investment. These rigidities result in part from legal and microeconomic barriers that limit economic flexibility. Inflexibility can prolong periods of slow growth because an economy is less able to adjust effectively to changing conditions in its labor and product markets and achieve full levels of employment. According to the Organization for Economic Cooperation and Development (OECD), barriers to new business formation and investment are higher in Germany than the OECD average. A World Bank "employment rigidity index" scored Germany's labor market at 55 (scaled from 0-100, with higher scores implying greater rigidity) compared to 17 for Australia, 14 for Great Britain, and 3 for the United States. Germany's standardized unemployment rate is high (9.5 percent in 2005) and its long-term unemployment rate (measuring workers unemployed for a year or more) was more than 50 percent higher in 2004 than the average OECD rate.

Germany has taken some recent steps to reduce unemployment and accelerate its growth. Laws limiting temporary and part-time work have been relaxed. Passage of "Hartz IV" labor reforms in 2004 was aimed at reducing long-term unemployment by requiring unemployed workers to seek work more actively. Unit labor costs, which are one widely used indicator of competitiveness, have recently fallen relative to several other European countries. It is also hoped that Germany's new government, which took office in November 2005, may strengthen other growth incentives. Like Japan, stronger growth in Germany will encourage a larger share of its domestic savings to be used at home rather than invested abroad.

China—Exchange Rate Management and a Rising Saving Rate

With \$69 billion in net outflows, China was the world's third largest net capital exporter in 2004. China's role as a net capital exporter may seem surprising given the large foreign investment inflows it experiences. While China does receive substantial foreign investment, it experiences even larger capital outflows due to foreign reserve accumulation by its central bank that results from its foreign exchange regime. As China's reserves have risen in recent years, its capital account balance has moved toward larger deficits and its current account toward larger surpluses. In 2004, China's current account surplus was equivalent to 4 percent of GDP (note that in December 2005, China increased the estimate of its 2004 GDP, which is likely to reduce the size of this current account surplus relative to GDP). Current projections indicate China's current account surplus is likely to have exceeded 6 percent of GDP in 2005.

China's reserves have increased due to its rising current account surpluses, net private capital inflows, and tightly managed pegged exchange rate system. China first adopted its currency peg in 1994, linking its currency (the renminbi) to the U.S. dollar at a rate of 8.3 renminbi-per-dollar. To maintain this peg, China's central bank has purchased large amounts of foreign currency assets in recent years to prevent its currency from appreciating. Even after modifying its exchange rate peg in July of 2005, however, (linking the renminbi to a basket of currencies rather than the U.S. dollar alone) China's foreign reserves have continued to rise. By the end of 2005, China's foreign reserve level exceeded \$800 billion and may rise to \$900-\$1000 billion by the end of 2006. Between 2000 and 2005, China's foreign reserves increased by more than \$600 billion.

In terms of its saving and investment balance, China's net capital outflows have resulted primarily from a rising saving rate. While China's rate of domestic investment has also been rising (projected 46 percent of GDP in 2005 prior to its GDP revision), its saving rate has risen even more rapidly. At roughly 52 percent of GDP, China's saving rate is the highest in the world.

Several factors contribute to China's high saving rate. China's "one child" policy, enacted to control its population growth, has contributed to its aging population by reducing the share of younger groups within its population. Because older workers typically earn and save more than younger workers, China's saving rate has increased as its workforce has aged. The absence of a strong social safety net (including adequate public pensions and health care) increases the need for precautionary household saving. The absence of well-developed financial markets and consumer credit mechanisms contribute to high saving by forcing many people in China to save large amounts of cash before making purchases rather than by taking consumer loans that can be repaid gradually. China's tightly managed exchange rate and foreign exchange

intervention to limit currency appreciation also contribute indirectly to its high saving rate. Saving is encouraged, in effect, because consumption is discouraged by China's exchange rate policy. With a stronger currency, the global purchasing power of China's currency would rise, raising its income (in global terms) and consumption share, and thus reducing its rate of domestic saving.

Greater exchange rate flexibility would encourage China's productive resources to move toward domestic rather than export production. Greater financial development would help to raise consumption spending (and reduce saving) by providing credit mechanisms for purchases that are currently paid for with cash. A reduction in China's saving rate and greater reliance on domestic demand are essential for China to sustain its future growth. At roughly 45 percent of its GDP, China's domestic investment rate could create future risks for its economy (see Box 6-2).

Russia—Growth in “Petrodollars” and a Rising Saving Rate

With \$60 billion in net outflows, Russia was the world's fourth largest capital exporter in 2004. Russia's net capital exports have been closely linked to higher export revenues resulting from rising oil and natural gas prices. Oil export revenues are sometimes referred to as “petrodollars.” With oil sales accounting for over 40 percent of its exports, Russia's export revenues rose by more than 50 percent between 2002 and 2004 (\$107 billion to \$183 billion) while its current account surplus rose to more than 10 percent of GDP.

In terms of its domestic saving and investment balance, Russia's growing net capital outflows have resulted primarily from higher saving. Between 2002 and 2004, domestic saving rose from 29 percent to 31 percent of GDP. A higher saving rate has been reflected by rising fiscal surpluses. Between 2002 and 2004, Russia's fiscal surplus rose from 1 to 5 percent of GDP while its rate of net private sector saving declined from 8 to 5 percent of GDP.

Large petrodollar increases have also occurred in other oil producers. Chart 6-3 shows current account surplus levels among 12 of the world's largest oil exporters, whose combined current account surplus and net capital outflows rose by 134 percent between 2002 and 2004.

The United States and Net Capital Inflows

Overview

The United States received \$668 billion in net foreign capital inflows in 2004 (including \$85 billion in net statistical discrepancies recorded in its capital account). This capital account surplus was the counterpart to the U.S. current account deficit. This section examines four questions about the U.S.

Box 6-2: High Saving and Financial Sector Inefficiency

Can a country save too much? While a higher saving level might always seem beneficial, higher saving can create costs if those savings are poorly used. Excess saving can sometimes lead to overinvestment that reduces the quality and efficiency of new capital investment and can sometimes create problems in a country's banking system by increasing the share of non-performing loans (NPLs).

An NPL is a loan that cannot be fully repaid by a borrower. Higher NPL ratios imply that investment spending may be inefficient because loans are not being fully repaid. High NPLs can create a number of problems. One problem is that banks often become more cautious about new lending as NPL ratios rise. New loans are unlikely to be approved if previous loans are not being repaid. Slower bank lending, in turn, can slow economic growth more broadly.

Another more direct problem can result when NPL ratios become so high that banks themselves face bankruptcy due to widespread loan defaults and falling bank capital adequacy ratios. In this case, governments must sometimes recapitalize weak banks or pay off insured depositors of banks they close. The cost of closing U.S. savings and loan institutions that failed in the 1980s was \$150 billion, or roughly 3 percent of GDP. In Chile, bank failures in the early 1980s cost more than 40 percent of GDP. Spain paid costs equivalent to nearly 20 percent of its GDP following a banking crisis in the late 1970s and early 1980s.

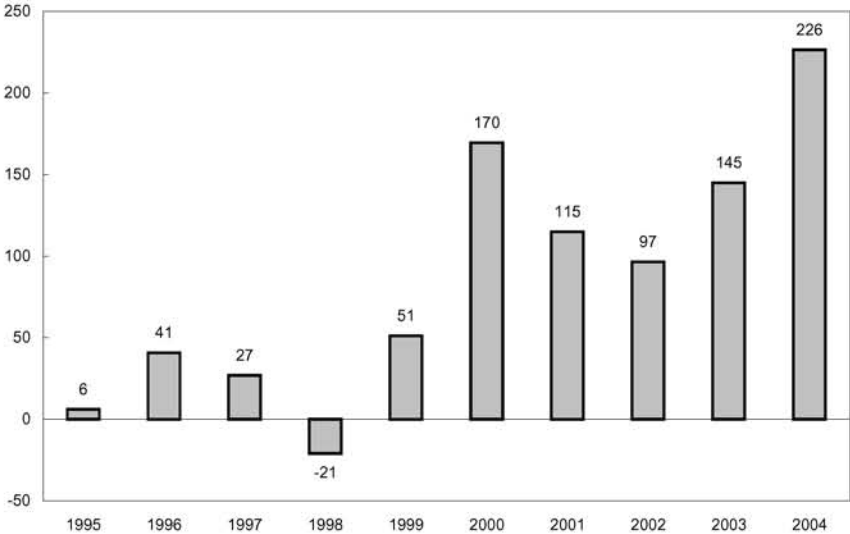
High saving rates can increase NPLs by encouraging banks to take imprudent risks. For example, lending standards may be reduced. Loans for weak borrowers that otherwise lack creditworthiness are more likely to be approved when saving is high and interest rates are low. If interest rates later rise, however, borrowers whose rates rise may not repay their loans, causing NPL ratios to rise. If in contrast interest rates that borrowers pay remain fixed, then banks can again suffer losses because they must pay higher rates to their depositors but cannot charge higher interest rates on loans to their current borrowers.

Japan arguably experienced a large capital overhang in the 1990s after a long period of high saving and investment as well as the emergence of its "bubble economy" in the late 1980s. Average saving and investment rates in Japan were roughly 35 percent of GDP in the 1970s and 30 percent of GDP in the 1980s. China, however, likely has even higher saving rates. Not surprisingly, China's NPL ratio is also believed to be high. While China's official statistics report NPLs are roughly 10 percent of outstanding loans, unofficial estimates suggest China's NPL ratio may be closer to 25 percent (by comparison, NPLs among U.S. banks are less than 1 percent).

Chart 6-3 Current Account Balances of Oil-Producing Countries

Oil producers have experienced large recent increases in their current account surpluses.

Billion Dollars



Note: Includes Algeria, Iran, Indonesia, Kuwait, Libya, Nigeria, Norway, Qatar, Russia, Saudi Arabia, United Arab Emirates, and Venezuela.

Source: International Monetary Fund, *World Economic Outlook*, September 2005.

capital account: (1) How do U.S. capital inflows compare with other countries? (2) Has the U.S. share of global capital inflows changed? (3) Has the composition of U.S. capital inflows changed? (4) What factors encourage foreign capital flows into the United States?

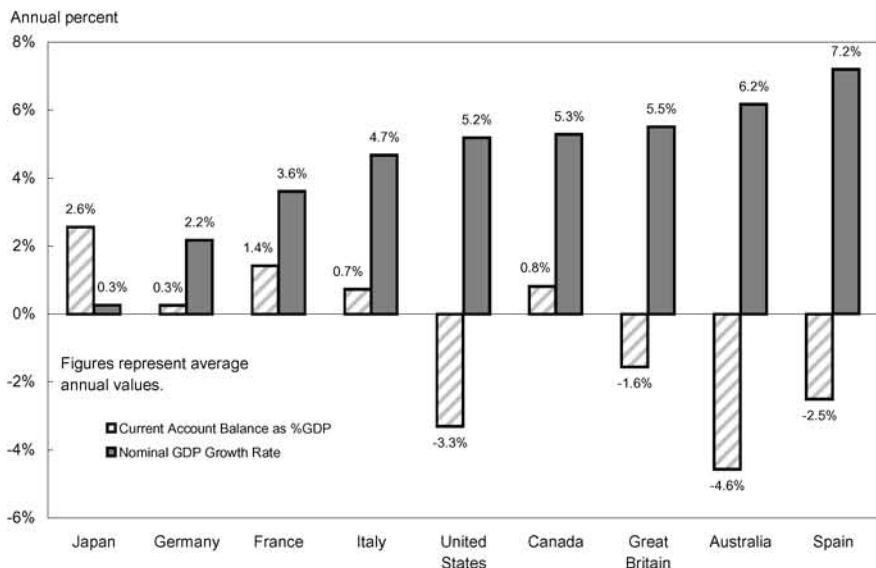
Most of this section focuses on the final question. One conclusion is that a high rate of growth relative to many other advanced economies has contributed to U.S. net capital inflows. Among advanced economies, capital flow patterns in the past decade have tended to be positively correlated with growth performance. Countries with higher rates of growth have tended to run current account deficits (and received net capital inflows), while countries with lower growth rates have tended to run current account surpluses (and experience net capital outflows—Chart 6-4).

Net Capital Importers—International Comparisons

Since 1995, three countries have been consistent recipients of net capital inflows—the United States, Australia, and Great Britain. Average annual net capital flows to Australia have been largest (4.6 percent of GDP), second largest for the United States (3.3 percent of GDP), and third largest for Great Britain (1.6 percent of GDP). Spain also received average annual net capital inflows (2.5 percent of GDP) during this period. Australia has the longest

Chart 6-4 Annual Growth and Current Account Balances - 1995-2004

Among advanced economies, countries with higher rates of growth have tended to run current account deficits.



Source: International Monetary Fund, *World Economic Outlook*, September 2005.

record of capital account surpluses (and current account deficits), receiving net foreign capital inflows every year since 1974.

Between 2001 and 2004, net capital inflows increased for most of these countries. Spain's net inflows rose by 1.4 percent of GDP (to 5.3 percent of GDP). U.S. inflows rose by 1.9 percent of GDP (to 5.7 percent of GDP). Australia experienced the largest increase, where net inflows rose by 4.1 percent of GDP (to 6.4 percent of GDP). Net inflows to Great Britain slowed slightly (to 2.0 percent of GDP).

U.S. Share of Global Flows and the Asset Composition of U.S. Capital Inflows

The U.S. share of net global capital inflows has risen over the past decade. The United States received 33 percent of global net capital inflows in 1995, 62 percent in 2000, and 70 percent in 2004. The composition of net foreign capital inflows to the United States has varied. Between 1995 and 2004, foreign official sector holdings of U.S. assets averaged 14 percent of foreign asset holdings (ranging from a high of 16 percent to a low of 11 percent). Gross foreign direct investment (FDI) inflows to the United States, representing larger foreign equity purchases, averaged 26 percent of foreign holdings in this period (ranging from a high of 33 percent to a low of

22 percent). Foreign holdings of U.S. Treasury securities averaged 15 percent of foreign holdings (ranging from a high of 21 percent to a low of 11 percent).

Causes of U.S. Capital Inflows

What factors encourage large and persistent U.S. foreign capital inflows? Several factors, which reflect U.S. economic strengths, encourage these inflows. In particular, a high rate of U.S. growth encourages foreign capital to be “pushed” toward the United States. In contrast, one U.S. shortcoming that “pulls” foreign capital to the United States is its low rate of domestic saving.

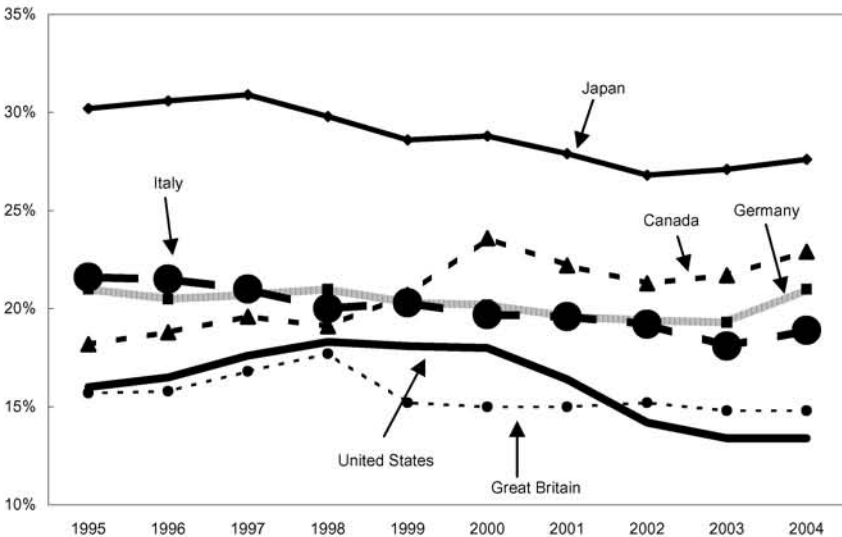
Low and Declining U.S. Saving

At 13 percent of GDP, the U.S. domestic saving rate is the lowest among the advanced economy countries (Chart 6-5). Moreover, the U.S. domestic saving rate has declined in recent years. With a domestic investment rate equivalent to 20 percent of GDP, low U.S. saving requires the United States to draw on foreign saving to fund a part of its domestic investment. This excess U.S. demand for saving is reflected by the U.S. current account deficit.

Chart 6-5 Gross National Saving Rates - 1995-2004

The United States has had the lowest rate of national saving among advanced economies since 2002.

Percent of GDP



Source: International Monetary Fund, *World Economic Outlook*, September 2005.

When we disaggregate the decline in U.S. domestic saving into its three parts—personal saving, corporate saving, and public saving—we see the personal saving rate has declined from 3.4 percent of GDP in 1995 to 1.3 percent of GDP in 2004 (for more discussion, see Chapter 3 in this report on Saving for Retirement). This decline in personal saving is mirrored by a rise in personal consumption spending, whose share of GDP has risen from 67 percent to 70 percent of U.S. GDP. U.S. corporate saving has remained relatively stable at between 18 and 19 percent of GDP.

Public sector saving also declined. Between 2000 and 2004, the federal budget balance went from a surplus equivalent to 2.4 percent of GDP to a deficit equivalent to 3.6 percent of GDP. Fiscal deficits represent dissaving, or net borrowing, which requires the public sector to draw on domestic private sector resources (firms and households) and the foreign sector. While a growing fiscal deficit has contributed to U.S. demand for foreign saving, and thus affected the U.S. current account deficit, the extent to which it has done so is unclear (Box 6-3).

Box 6-3: The Link Between Fiscal and Trade Deficits

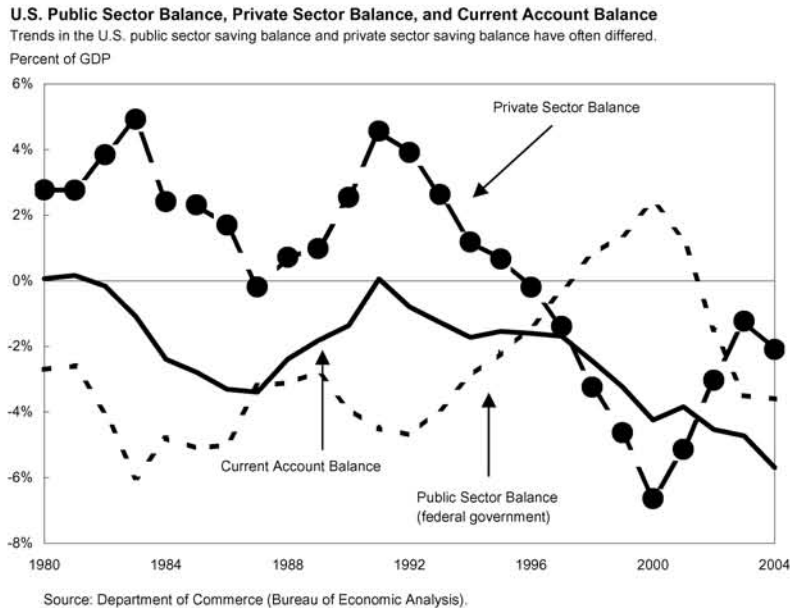
Most economists agree that fiscal deficits will, all else equal, lead to an increase in a country's trade and current account deficits. Fiscal deficits are a form of "dissaving," so fiscal deficits reduce the availability of domestic saving to fund investment. Unless this decline is matched by an equal decline in domestic investment, net demand for foreign saving will rise. Fiscal deficits will thus cause net capital inflows to increase.

However, the effect of fiscal deficits on trade and current account deficits may be considerably less than dollar-for-dollar. For example, one study by the Federal Reserve has estimated that each dollar change in the fiscal deficit leads to a change in the trade deficit of approximately 20 percent. This means that reducing the U.S. fiscal deficit by \$100 billion would reduce the trade deficit by only \$20 billion.

The relationship among fiscal deficits, the current account, and the capital account is complex because the current and capital accounts also depend on private sector behavior. In Japan and Germany, for example, recent current account surpluses and capital outflows have been associated with large fiscal deficits because private saving balances in those countries have been large and outweighed public sector dissaving.

Box 6-3 — continued

As the chart below indicates, U.S. fiscal and current account balances have sometimes moved in the same direction and other times in different directions. For example, between 1997 and 2000 the U.S. Federal public sector balance moved from a deficit of 0.3 percent of GDP to a surplus of 2.4 percent of GDP. During this same period, the current account deficit widened from 1.7 percent to 4.2 percent of GDP. In the early 1980s and early 1990s, the United States came close to current account balance even though the public sector ran large fiscal deficits because a large private sector saving surplus existed then.



High U.S. Economic and Productivity Growth

Other factors that attract foreign capital inflows to the United States reflect strengths of the U.S. economy. One factor is the high rate of U.S. growth. Between 1995 and 2004, annual real GDP growth in the United States averaged 3.2 percent compared to 1.1 percent in Japan, 1.4 percent in Germany, and 2.3 percent among Eurozone economies (the group of 12 European countries with a common currency). In the most recent years within this period, these growth differentials widened further.

Higher growth tends to attract foreign capital for two reasons. First, higher growth leads to a higher rate of import growth. All else equal, higher import growth will lead to a decline in a country's trade balance and increase its demand for foreign saving. Second, higher growth attracts foreign capital inflows because growth contributes to higher potential corporate earnings and investment returns.

High Productivity Growth

High U.S. growth and capital inflows are supported by high productivity growth. The broadest measure of productivity is *multi-factor productivity* (which broadly measures the efficiency with which capital and labor inputs are used). OECD data comparing multi-factor productivity across countries for the period 1995-2003 indicate that the United States and Australia had relatively high rates of productivity growth, Canada, Great Britain, and Germany had more modest rates of growth, while Japan had a low rate of productivity growth.

Favorable U.S. Business Climate and Global Competitiveness

A sound business climate can also support high growth and foreign capital inflows. A sound business climate can enhance efficiency by strengthening competition. It can reinforce profit maximizing incentives and effective corporate governance. A sound business climate can also encourage entrepreneurship by reducing the administrative burdens of new business formation. It can enhance the flexibility of industries through laws that facilitate rapid restructuring or liquidation of bankrupt firms. In addition, it can promote efficiency and specialization by reducing international trade barriers.

Several organizations compare business climates across countries. The World Bank publishes an annual "Doing Business" survey that compares legal frameworks and business practices. Countries are ranked in part by an "ease of doing business index." Results from the World Bank's most recent survey ranked New Zealand 1st, the United States 3rd, Australia 6th, Great Britain 9th, Japan 10th, Germany 19th, Spain 30th, Russia 79th, and China 91st. Another competitiveness survey is published by the World Economic Forum (WEF). In the WEF's most recent survey, the United States ranked second in overall competitiveness (Finland was first). The report ranked Japan 12th, Great Britain 13th, Germany 15th, China 49th, and Russia 75th.

Financial Market Size

The size of U.S. financial markets also attracts foreign capital by encouraging investors to hold dollar-denominated assets. Large and efficient financial markets reduce transaction costs and liquidity risk (the risk that assets cannot be sold at fair value on short notice) and increase the ability to diversify asset

holdings. In 2004, U.S. financial markets comprised 32 percent of global financial markets compared to 26 percent for Eurozone countries and 15 percent for Japan. U.S. stock market capitalization represented 44 percent of global equity markets compared to 16 percent for Eurozone countries. U.S. bond markets represented 39 percent of global bond markets compared to 27 percent for Eurozone countries.

Global Role of the U.S. Dollar

Widespread use of the dollar in the global economy also contributes to U.S. capital inflows. The dollar's role can be seen in terms of the three classic functions of money. First, the dollar serves as a *medium of exchange*. Private firms in different countries use dollars to settle transactions. Second, the dollar serves as a *unit of account*. Globally traded goods like oil are denominated in dollars. Many global debt securities are also dollar-denominated. A number of countries also use the dollar either as their own currency or as an exchange rate peg to which their own currencies are tied. Third, the dollar is a *store of value*. Private firms hold dollars to help hedge financial risks. Central banks hold dollars as reserves to intervene in foreign exchange markets, meet foreign currency demand for debt servicing payments, or help maintain general financial confidence.

In recent years, the dollar's future role as a global reserve currency has been debated. Some have argued this role may diminish. One argument is that the dollar will face competition from the euro. However, recent estimates indicate the dollar's role as a reserve currency has been broadly stable over the past decade. In 1995, 59 percent of global reserve holdings consisted of dollar-denominated assets. In 1999, this figure rose to 71 percent and then declined to 66 percent in 2004.

U.S. Capital Flow Sustainability

In principle, the United States can continue to receive net capital inflows (and run current account deficits) indefinitely provided it uses these inflows in ways that promote its future growth and help the United States to remain an attractive destination for foreign investment. The key issue concerning U.S. foreign capital inflows is not their absolute level but the efficiency with which they are used. Provided capital inflows promote strong U.S. investment, productivity, and growth, they provide important benefits to the United States as well as to countries that are investing in the United States.

To evaluate the *sustainability* of these inflows, economists often evaluate a country's *external debt burden*. This debt burden can be seen in terms of a *stock* and a *flow* burden. One stock measure that is sometimes examined is

a country's *net foreign asset position*. Net foreign assets measure the value of a country's foreign assets relative to the liabilities it owes to foreigners. When foreign assets exceed liabilities, a country is a *net foreign creditor*. When foreign liabilities exceed foreign assets, it is a *net foreign debtor*. Net capital inflows contribute to net foreign debt because some share of these inflows reflect foreign purchases of debt instruments. A rising level of net foreign debt may be a warning sign that debt could become unsustainable in the future.

U.S. current account deficits in recent years have caused its level of net foreign debt to rise from negative 4 percent of GDP in 1995 to negative 22 percent in 2004. Other countries vary in their net foreign asset or debt positions. For example, Japan is a net foreign creditor (foreign assets exceeding foreign liabilities) with net foreign assets equivalent to 38 percent of its GDP. In contrast, Australia is a net debtor with net foreign debt equivalent to 64 percent of its GDP. Great Britain's net foreign debt is equivalent to 13 percent of its GDP. While net foreign debt or asset positions can be a useful indicator, however, these figures must be interpreted cautiously since what constitutes an "excessive" amount of net foreign debt is far from clear.

One *flow measure* of the external debt burden is a country's *net foreign income*. Countries either receive or pay foreign income depending on their foreign asset and liability levels as well as the rate of return they earn and pay on these assets and liabilities. When a country receives more in interest, dividends, profit remittances, and royalties on its foreign assets than it pays on its foreign liabilities, it is a *net foreign income recipient*. When payments exceed receipts, a country makes *net foreign income payments*.

One striking feature of the U.S. balance of payments accounts is that the United States has continued to earn net foreign income despite its rising level of net foreign debt. For example, the United States earned \$30 billion in net foreign income in 2004 despite a stock of net foreign debt equivalent to \$2.5 trillion. By comparison, Japan received \$86 billion in net foreign income payments in 2004 despite the fact that it held \$1.8 trillion in net foreign assets. Between 1995 and 2004, the United States earned over \$200 billion in net foreign income despite current account deficits that totaled more than \$3 trillion during this period. Therefore, U.S. external debt has not appeared burdensome by this measure because its net foreign income flows have remained positive.

While U.S. capital inflows can continue indefinitely, recent levels of net inflows received are likely to moderate in the future. At more than 6 percent of GDP, U.S. net capital inflows are unusually high by historical standards. While no specific "critical value" exists beyond which a country can no longer necessarily receive net foreign capital inflows, recent growth in U.S. net inflows has attracted substantial attention. The key questions concern the rate and magnitude by which U.S. net inflows moderate in the future. In one scenario, U.S. net capital inflows might drop quickly. In another "soft

landing” scenario, the adjustment process would occur in a more gradual manner. While a large share of U.S. net capital inflows reflects foreign private sector investment that believes a higher risk-adjusted return can be earned by investing in the United States than can be earned by investing elsewhere, some policy adjustments (see below) in the United States and abroad could nonetheless help to increase the likelihood of a soft landing.

Conclusion

This chapter has emphasized the interdependent nature of the global financial system. To understand U.S. net capital inflows, one must also understand factors that underlie net capital outflows from countries like Japan, Germany, China, and oil-producing and exporting countries like Russia. Global capital flows reflect a wide array of conditions in many countries rather than developments in the United States alone. In some instances, global capital flows reflect expectations among market participants who invest in countries where they expect to earn the highest level of risk-adjusted returns. In other instances, capital flows reflect policy decisions by central banks to manage their exchange rates.

In both instances, global capital flows provide important benefits for net capital importers as well as net capital exporters. Net capital importers like the United States benefit because they can maintain a level of domestic investment they would otherwise have to reduce given their levels of domestic saving. Net capital exporters benefit because they can earn higher returns on the saving they invest abroad than they expect to earn by investing in their own countries.

The interdependence of the global financial system implies that no one country can reduce its external imbalance through policy action on its own. Instead, reducing external imbalances requires action by several countries. Specifically, at least four steps may help to reduce these imbalances.

First, the United States must work to raise its domestic saving rate. Higher U.S. saving will reduce U.S. demand for other countries’ savings. To increase saving, the United States should continue its efforts to reduce its fiscal deficit and raise its personal saving rate. Sections of the U.S. tax code that discourage saving should be reformed as appropriate. Health care, social security, and other entitlement programs will require reforms given their large projected impact on future public spending.

Second, China and other Asian countries should reduce their excess saving through policies and reforms that promote higher domestic demand. Financial systems can be reformed and modernized to help expand consumer credit and reduce the need for high levels of precautionary saving. Managed

exchange rate regimes should be liberalized more fully. Greater exchange rate flexibility would provide China with a useful policy tool to help stabilize its business cycle. It would also help China to reorient its future growth away from net exports and toward higher domestic demand.

Third, Japan, Germany, and several other large countries should reduce their supplies of excess saving by promoting higher private domestic demand and improving their economic growth performance. Raising private domestic demand will require the implementation of further structural reforms in these countries that strengthen incentives for private consumption and private investment. In turn, higher consumption and investment will help to reduce their external surpluses. While structural reforms are often politically difficult to enact, they are essential if long-term growth performance in these countries is to improve.

Finally, oil producing and exporting countries could increase their domestic investment levels. At least some of this spending could be used to expand oil sector production that would reduce excess saving in these countries, enhance the future productive capacity of these economies, and help to ensure adequate future supplies of oil for the global economy.

The History and Future of International Trade

For many decades, the United States has worked to break down trade barriers across the globe through a wide range of institutions and agreements. Both the United States and our trading partners have derived substantial benefits from greater global economic integration. Many American consumers, firms, and workers are better off because of these efforts.

While the economic research and performance of this time period show the benefits of trade outweigh the costs, trade liberalization has always brought anxieties. This has been the case both here in the United States and throughout the world. Temptations to retreat to economic isolationism often occur when trade agreements are negotiated and current negotiations are little different in this regard. Therefore, this chapter provides a retrospective on U.S. trade policy and an evaluation of the payoff from greater trade and investment liberalization that has been at the forefront of this country's international economic policy for the last 70 years.

The key points in this chapter are:

- Over the past 70 years, policymakers across political parties have consistently recognized the importance of unfettered international commerce to America's standard of living and economic growth, and have achieved major trade liberalization both here and abroad.
- The net payoff to America from these achievements has been substantial. Many American consumers, firms, and workers have benefited from increased trade.
- A number of barriers to trade, especially in services, remain, and the potential gains to the United States and other countries from further liberalization are still significant. To move beyond trade liberalization in goods, the United States is pursuing greater economic cooperation and more-open markets with our trading partners in order to stimulate economic growth.

A Retrospective on Trade

The country's historical influence in promoting global trade liberalization can be traced back to the early part of the twentieth century, and it spans both political parties. The early 1930s proved to be a critical turning point in the evolution of modern American trade policy and heralded the first major

American trade liberalization effort. In the decades following, the United States has spearheaded multinational, regional, and bilateral negotiations in the interest of advancing trade liberalization. This retrospective illustrates the undeniable progress toward trade liberalization in the United States. Revenues from tariffs (a tariff is a tax levied on imports coming into the United States) in the early 1900s accounted for about half of Federal revenues compared to less than 2 percent today. From the inception of this country until the Civil War, tariff revenues were a major source of government revenue. The addition of the sixteenth amendment to the U.S. Constitution in 1913 broadened the tax base by introducing the personal and corporate income tax. This change began the shift away from indirect taxation (import duties and excise taxes) toward direct taxation on personal and corporate incomes, thereby reducing this country's dependence on import duties as a form of revenue.

Before the 1930s, U.S. trade practices fluctuated between trade-promoting and trade-restricting policies. Prior to World War I, President Woodrow Wilson pursued an internationalist foreign policy that resulted in import tariff reductions through the Underwood Tariff Act of 1913. The economic depression and subsequent reversion to isolationism that followed the 1929 stock market crash led to a rejection of Wilsonian policies in favor of greater protectionism. The Tariff Act of 1930 (otherwise known as the Smoot-Hawley Tariff) significantly raised average duties on selected imports to an all-time high of 59 percent. Such protectionism was designed to reduce unemployment and increase domestic output. By reducing export markets, however, the heightened tariff and nontariff trade barriers (such as quotas or quantitative import restrictions) exacerbated the Great Depression. The collapse of world trade from 1929 to 1933—a decline of more than two-thirds in just four years—followed in the wake of protectionist policies as countries depreciated their currencies, raised tariffs, and imposed quotas. These isolationist policies contributed to a spiraling contraction of world trade and a collapse of domestic demand.

The historic Reciprocal Trade Agreements Act of 1934 marked a turning point in modern trade legislation. The 1934 Act departed significantly from previous protectionist policies, and it began the historic shift toward lower U.S. and foreign trade barriers and greater global economic engagement. Signed into law by President Franklin D. Roosevelt, the Act passed Congress with overwhelming support. The 1934 Act was the first of many steps over the twentieth century leading to America's relatively liberal trade stance today. Table 7-1 shows that key milestones in American trade history have been consistently achieved by a number of administrations.

The Trade Act of 1934 changed U.S. trade policy. The 1934 Act made trade a shared Congressional and Executive Branch responsibility, and instituted a so-called bargaining tariff. Up to that point, trade policy had been primarily

TABLE 7-1.—*Important Milestones in American Trade History*

Milestone (years of negotiation)	Year Signed into U.S. Law	Administrations involved
Reciprocal Trade Agreements Act of 1934	1934	Roosevelt
Kennedy Round (1962–1967)	1962	Kennedy, Johnson
Tokyo Round (1973–1979)	1979	Nixon, Ford, Carter
Uruguay Round Agreements Act (1986–1994)	1994	Reagan, G.H.W. Bush, Clinton
North American Free Trade Agreement (1990–1993)	1994	G.H.W. Bush, Clinton
Trade Act of 2002 and Renewal of Trade Promotion Authority (2001–2002)	2002	G.W. Bush

a product of the legislative exercise of its Constitutional authority over foreign commerce. This Constitutional authority left Congress open to the protectionist demands of specific industries and special interests. President Roosevelt and Secretary of State Cordell Hull recognized this vulnerability and worked with Congress to enact this reciprocal trade program to make lower tariffs more politically durable. With the enactment of the Trade Act of 1934, Congress suspended passage of product-specific trade laws and delegated specific tariff-setting to the Executive Branch. Doing so formally changed the way Congress handled trade issues by insulating elected representatives from the pressures that had led to protectionism in the past.

The 1934 law also instituted the so-called bargaining tariff. This concept linked tariff setting to international negotiations, whereby U.S. tariff cuts were extended in bilateral negotiations to countries that offered reciprocal tariff reductions benefiting U.S. exporters. In this way, the bargaining tariff helped to shift the balance of trade politics by engaging the interests of U.S. exporters. The system effectively allowed the United States to reduce its own trade barriers and to persuade the rest of the world to reciprocate. In the aftermath of World War II, policymakers correctly predicted that postwar trade expansion would help to usher in a remarkable era of world prosperity and contribute to conditions for a stable peace.

A commitment to the Wilsonian notion that prosperity and peace go hand in hand is at the core of postwar trade liberalization for both political parties in the United States. An extension of the reciprocal trade agreement, which Presidents Roosevelt and Truman both had recommended as a keystone of the country’s postwar international economic policy, passed Congress with strong support in 1945. The enabling legislation put the Administration in a position to begin in earnest the process of dismantling global trade barriers. President Harry S. Truman signed the General Agreement on Tariffs and Trade (GATT) in 1947, bringing the United States into the multilateral trade regime by executive agreement. The GATT took effect in 1948 and served as

a forum for trade negotiations whereby every signatory country could enjoy the concessions of every other signatory (otherwise known as most-favored-nation status). Membership in the GATT not only brought the United States into the multilateral trade regime but also provided a vehicle to rebuild the postwar economies of Europe and Japan. The lessons of Smoot-Hawley contributed to broad support for freer trade that was to become a critical component of U.S. international economic policy. This political consensus marked a shift toward a broadly accepted liberal market and free-trade philosophy that set the stage for the various multilateral negotiating rounds that were to follow.

The next major acknowledgment of the necessity of liberalizing trade came in the 1960s. President John F. Kennedy led the Trade Expansion Act of 1962, which was approved with substantial support in Congress. The Act authorized the U.S. government to negotiate tariff cuts of up to 50 percent, which persuaded other countries to actively participate in the Kennedy Round (1962–1967) of multilateral trade negotiations. Congressional support was partly due to the inclusion of legislation to assist workers affected by trade, also known as Trade Adjustment Assistance. At the time, the Kennedy Round signified the most ambitious series of trade negotiations ever attempted under the auspices of the GATT. The Round included negotiations on agriculture for the first time, and reduced barriers to exporters for developing countries.

The Tokyo Round (1973–1979) led to further tariff reductions and provided new disciplines on nontariff barriers. The Tokyo Round included “codes of conduct” that were designed to curtail the use of such barriers as instruments of protection. Launched under President Richard M. Nixon, continued by President Gerald R. Ford, and signed into law by President Jimmy Carter with the Trade Agreements Act of 1979, the Round demonstrated a strong, consistent bipartisan commitment toward freer trade.

As trade liberalization negotiations moved increasingly beyond tariff reductions in nonagricultural products, progress toward greater liberalization became more difficult for many countries. The Uruguay Round (1986–1994) launched under President Ronald Reagan nearly collapsed in 1990 over disagreements about lowering barriers on agricultural products. Following a redrafting of the agreement by GATT Director-General Arthur Dunkel, President George H.W. Bush spearheaded efforts to complete negotiations of the Uruguay Round, and in 1994 President Bill Clinton signed legislation implementing the final agreement. The Uruguay Round achieved the most fundamental reform of global trade rules since the creation of the GATT. The Round established the World Trade Organization (WTO), extended international trade rules beyond goods to include intellectual property rights and trade in services, and greatly improved procedures for countries to resolve disputes over international trade.

At present, the United States is actively engaged in the current Doha Development Round of multilateral trade negotiations that began in 2001. This round aims to liberalize agricultural trade, lower remaining barriers in nonagricultural goods trade, and reduce trade barriers in services. The Round focuses on increasing market access for developing countries as a means to encourage economic development. Progress has been slower than anticipated, but the eventual success of the previous Uruguay Round suggests that a favorable outcome from Doha will emerge.

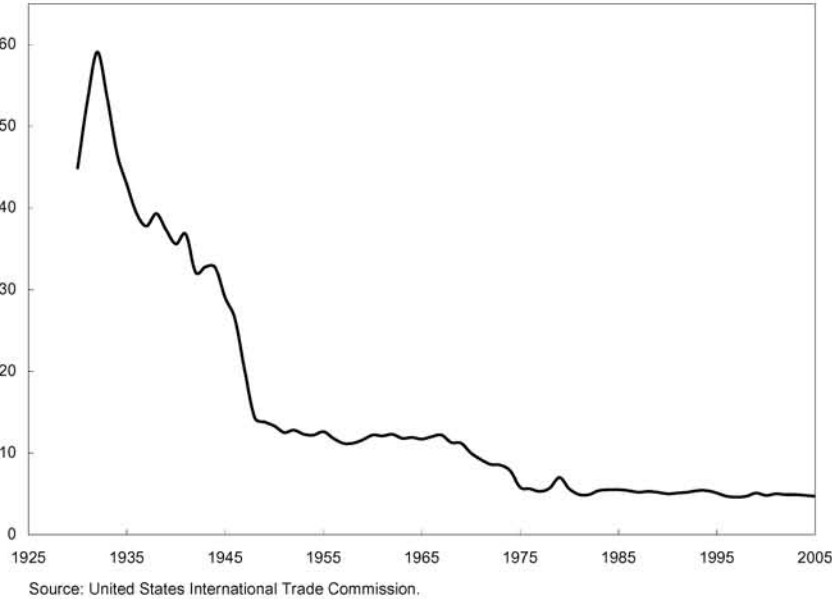
In addition to multilateral trade liberalization, over the past two decades the United States has signed a number of bilateral and regional trade agreements. The protracted nature of multilateral negotiations has been one factor that has led the United States to aggressively pursue other avenues toward free trade outside of the major negotiating rounds. Under President Reagan, the United States signed its first bilateral free trade agreement (FTA) with Israel in 1985. The United States and Canada signed a bilateral FTA in 1988 after three years of negotiations. The Bush Administration initiated negotiations for the North American Free Trade Agreement (NAFTA) in 1991, which President Clinton signed into law in 1993 and went into effect the following year. In addition to trade, NAFTA explicitly recognized the benefits of investment liberalization and included provisions designed to extend national (i.e., nondiscriminatory) treatment, among other protections to investors.

The United States has recently embarked on a renewed series of bilateral and regional free trade agreements. The ability of the United States to negotiate trade-liberalizing agreements was strengthened significantly when the President signed the Trade Act of 2002 into law. That legislation provides the Executive Branch with the ability to negotiate international agreements that are subject to an up or down vote, but not amendment, by Congress. The President's leadership was vital in securing this important authority to pursue a full trade agenda including multilateral, regional, and bilateral trade agreements. The President has implemented bilateral FTAs with Jordan, Chile, Singapore, and Australia. The Administration also has concluded FTAs with an additional ten countries: Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, the Dominican Republic (the Central American-Dominican Republic FTA, or CAFTA-DR), Morocco, Bahrain, Oman, and Peru. The United States is currently engaged in negotiations with the United Arab Emirates, the five nations of the Southern African Customs Union (Botswana, Lesotho, Namibia, South Africa, and Swaziland), Thailand, Panama, Colombia, and Ecuador. The adoption of CAFTA-DR is the latest chapter in America's trade book, which demonstrates the country's ongoing commitment toward trade liberalization and economic development.

Decades of U.S. trade liberalization achieved on a number of fronts have had a dramatic impact on U.S. openness to trade. Chart 7-1 shows how average U.S. tariffs have fallen since 1930. The average tariff on dutiable goods approached 60 percent at the height of the Great Depression and has dropped to 4.6 percent. The current average U.S. tariff on all goods (both dutiable and nondutiable) is just 1.4 percent.

Trade expansion has reached an important juncture, and resistance both here and abroad to further trade and investment expansion could jeopardize increased domestic and international economic growth. The retrospective presented above illustrates America’s historic achievements in trade liberalization, and, as the next section demonstrates, Americans, on average, have accrued immense gains along with our trading partners from this liberalization. The United States has a large stake in the current multilateral negotiations of the Doha Round. The gains from prior trade agreements provide grounds to stay the course on trade liberalization.

Chart 7-1 Average U.S. Tariff on Dutiable Goods, 1930-2005
Since 1934 the United States has moved consistently towards freer trade.
Average U.S. tariff, percent



The Payoff to America from Global Economic Integration

Trade liberalization remains a controversial subject because competition invariably raises both anxieties and opportunities. Reducing obstacles to trade can help economies grow more rapidly and efficiently in the long run and create better, higher-paying jobs, while global competition can lead to hardships for others in the short run. (Impacts of international trade on labor markets are discussed in Box 7-2 later in the chapter.) The appropriate social and political response to these hardships is a critical issue. For instance, at the macro level, pro-growth government policies can help set the environment for economic growth and job creation. Constructive policies that help displaced workers train for and find new work and increase the portability of pension and health benefits can also ease adjustment.

The gains from trade liberalization are more widely dispersed than the losses and often not readily apparent. These gains are evident in lower consumer prices and the greater variety of products available to consumers. International commerce helps countries focus resources on strengths and forces firms to innovate and to set prices more competitively. Studies show that firms that are engaged in the international marketplace tend to exhibit higher rates of productivity growth and pay higher wages and benefits to their workers. An economy with higher overall productivity growth can support faster GDP growth without generating inflation. And higher productivity growth means higher sustainable living standards. Taken together, the net benefits from increased economic integration (greater trade and investment liberalization) historically have been positive for the United States.

Benefits to Consumers

Lower Prices

International trade fosters competition, which in turn restrains cost. There is now ample evidence across many countries that greater trade openness and the resulting exposure to foreign competition reduces the ability of a country's firms to charge high markups above production costs. Pressures for lower prices arise from the direct impact of cuts in trade barriers being passed through to cuts in prices. They also arise from the broader impact of raising market contestability.

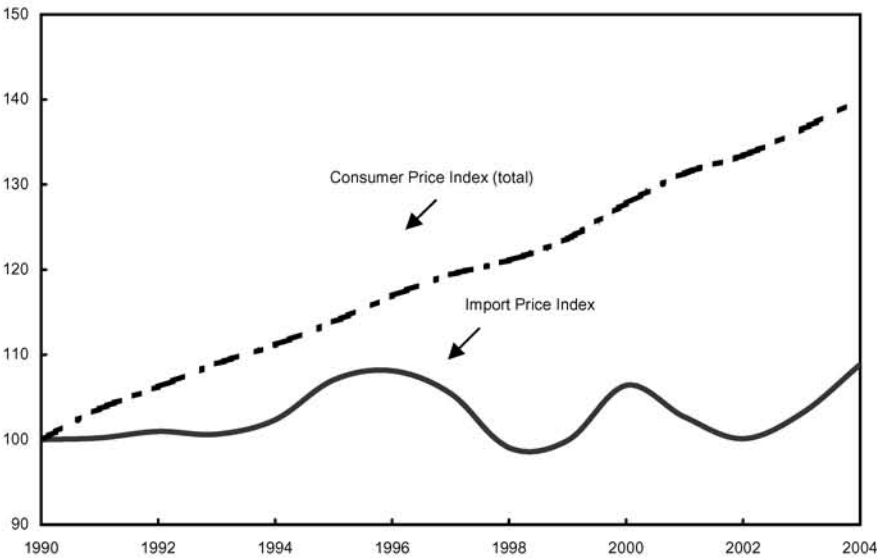
At the detailed product level, many studies have linked lower prices and/or price-cost markups to measures of trade openness such as tariff rates. Chart 7-2 presents broader evidence of how trade helps lower prices. It presents indices of U.S. consumer prices and U.S. import prices since 1990. There is a clear difference between the two indices: Overall consumer prices, which

include not just imported goods and services but largely nontraded goods and services, have risen much more than have import prices. The average annual growth in U.S. import prices for the period 1990–2004 was just 0.6 percent, compared to a 2.2-percent rise in overall consumer prices. In real terms, total U.S. imports grew threefold during this same period, from \$553 billion to \$1.5 trillion (in 2004 dollars).

In addition to the pro-competitive effects of trade, other important contributors to price restraint are technology advances and innovation. This has been especially true for consumer electronics and information technology (IT) products. For instance, in just the past eight years, consumer prices of color televisions are down 50 percent, and Americans today pay 60 percent less for camcorders and mobile phones. It can be difficult to empirically separate observed price declines into the relative contributions of trade, technological change, and other forces. But a simple approach to assessing the role of international trade in price changes is to compare price changes between more- and less-traded products. Consistent with the aggregate evidence in Chart 7-2, a clear divergence in price trends emerges when products are split in this way. Internationally traded products tend to experience lower inflation rates—even real price declines—while nontraded goods tend to exhibit price increases. Between 1997 and 2004, real prices fell for an array of highly traded goods, such as audio equipment (-26%), TV sets (-51%), toys (-34%), and clothing (-9%). In contrast, real prices rose for

Chart 7-2 Consumer and Import Price Growth, 1990-2004
Consumer price growth has outpaced import prices.

Index, 1990=100



Source: Department of Labor (Bureau of Labor Statistics).

largely nontraded products, such as whole milk (+28%), butter (+23%), ice cream (+18%), peanut butter (+9%), and sugar and sweeteners (+9%).

Exactly which Americans most enjoy the benefits of lower prices depends on which products enjoy the largest cuts in trade barriers. Box 7-1 discusses the regressive nature of the current U.S. tariff schedule.

Box 7-1: The Regressive Nature of U.S. Tariffs

While the average tariff applied to U.S. imports is relatively low at 1.4 percent, there are peaks within the U.S. tariff schedule that fall most heavily on lower-income consumers. Studies have shown that, on balance, U.S. trade barriers are regressive because they disproportionately raise the relative price of goods consumed by lower-income Americans. Some of the most restrictive trade barriers persist on everyday consumer products such as textiles, apparel items, and footwear.

Tariffs disproportionately affect the poor in two ways. First, many tariffs are highest on products that represent higher shares of income expenditures for lower-income households. Staple consumer products such as shoes and clothing face import taxes over 30 percent, some of the highest tariffs in the U.S. tariff schedule. Footwear represents 1.3 percent of income expenditures for lower-income households (1.5 percent for single-parent households) compared to just 0.5 percent for higher-income households. Similarly, lower-income households (and single-parent households) spend roughly 6 percent of their disposable income on apparel, while upper-income households spend just 4 percent.

Second, within these high-tariff product categories, tariffs are often most pronounced on the cheapest products. That is, products that are more commonly purchased by lower-income consumers are subject to higher import taxes than are those commonly purchased by upper-income consumers. For example, lower-priced sneakers (\$3–\$6 per pair) are marked up with a 32-percent tariff, while higher-priced sneakers, such as \$100 track shoes, are subject to a 20-percent tariff.

How did the structure of the U.S. tariff schedule become so regressive? The cause was not a concerted effort to maintain relatively high import taxes on cheaper products. Movement toward increased trade liberalization tends to occur more slowly in labor-intensive industries where greater liberalization may be viewed negatively. The situation may reflect a classic political-economy challenge to liberalizing trade. The beneficiaries of trade protection are often a much more concentrated, well-organized group of individuals or firms than the millions of households across the country that bear the costs. However, the current Doha Round of multilateral trade negotiations offers an opportunity to eliminate these tariffs and other trade barriers, provided other WTO members reciprocate.

Greater Product Variety

International trade also allows consumers to choose from a broader variety of goods and services. One study shows that the number of imported product varieties has increased by a factor of four over the last three decades, reflecting an important source of gains from trade. Welfare gains from variety growth alone have been estimated to be a remarkable 2.8 percent of GDP, which translates into gains of over \$4,000 for the average American family of four.

International trade allows year-round availability of seasonal and perishable food items such as fruits and vegetables. For example, U.S. consumers today enjoy grapes and peaches from Chile, limes and avocados from Mexico, mandarin oranges from China, and cashews from India, many during the off-season for U.S. production. Trade also provides U.S. consumers with greater variety and choice for agricultural products that the U.S. does not produce in large quantity. For example, Americans enjoy coffees from all over the world, including from Colombia, Costa Rica, Indonesia, Ethiopia, and Kenya.

Benefits to Firms and Their Workers

Firms can be linked to the global marketplace through many channels: exporting, importing, investing abroad, or receiving investment from foreign firms (foreign direct investment, or FDI). Stronger linkages to the global economy provide export opportunities for U.S. firms, allow firms to realize economies of scale, and provide the ability to establish and expand global production networks to lower prices and boost productivity. These opportunities can raise U.S. living standards by allocating national resources toward areas in which we have a comparative advantage and by raising firm productivity.

Firms exposed to global competition are exposed to the world's best practices in areas such as supply management, production processes, technology, and finance. Studies show that firms exposed to the world's best practices demonstrate higher productivity through many channels, such as learning from these best practices, and also creating new products and processes in response to this exposure. A number of U.S. industries have been compelled to adjust and innovate as a result of foreign competition via trade and FDI in the United States.

For instance, by the late 1970s, many Japanese carmakers were outperforming U.S. companies in overall assembly productivity, and U.S. imports of Japanese cars were rising sharply. America's leading automakers initially focused their response on trade protection. But competitive pressures from Japanese firms continued, in particular through foreign investment in the United States in the 1980s. This foreign investment established and expanded "transplant" production facilities in the United States that soon achieved

productivity levels on par with Japanese plants. These transplants proved to be a major spur to stepped-up innovation and performance among American firms. In the steel industry, a combination of foreign competition and the growth of the highly productive mini-mill sector has compelled U.S. integrated-steel producers to improve their performance.

Various studies show that globally engaged firms have higher productivity growth and tend to innovate more than their purely domestic counterparts. For instance, evidence from the United Kingdom shows that from 1998 to 2000, just 18 percent of domestic firms reported either product or process innovations compared to 45 percent of globally engaged firms. In recent years in the United States, over 80 percent of total private-sector R&D spending has been accounted for by multinational companies (i.e., by the combination of U.S. parents of U.S.-headquartered multinationals and U.S. affiliates of foreign-headquartered multinationals). Sales per employee, one simple measure of productivity, is up to one-and-a-half times larger in exporting plants than in others. Value-added per employee, another measure of productivity, is up to one-and-a-third times larger in exporting plants than in others. Exporting plants adopt new technologies more frequently and intensively than nonexporting plants; they also report more significant benefits from doing so.

The different channels through which international trade and investment contribute to productivity growth are very important for long-run U.S. living standards. Since 1995, the United States has enjoyed an acceleration in labor-productivity growth. From 1973 to 1995, output per worker hour in the nonfarm business sector grew at 1.4 percent per year. From 1995 to 2004, this rate accelerated to 2.9 percent per year—with rates averaging over 3 percent since 2000. Productivity growth of just 1.4 percent per year means average living standards take 50 years to double. At the faster rate of 2.9 percent per year, living standards take just 24 years to double.

Many researchers have concluded that IT hardware has been at the core of this productivity acceleration, citing both faster productivity growth among IT-hardware firms and greater investment in IT hardware throughout the economy. It is important to note that these highly successful IT-producing U.S. firms are among the most globally engaged firms in the U.S. economy. Exports and imports in the IT sector represent over 70 percent of sector output, compared to an economy-wide average of 10 percent. In recent years, IT firms have grown stronger by expanding their global production networks through increased international investment and trade, with output that entails multiple production stages across multiple countries. Indeed, today the United States runs large trade *deficits* in core IT sectors such as computers and office products (see Chapter 10).

American workers, like firms, also benefit from stronger linkages to the global economy. Studies show that workers in U.S. multinationals receive wages and benefits up to 18 percent higher on average than their peers in purely domestic firms. International investment plays an important role, too. Evidence suggests that wage premiums are 19 percent and 13 percent for blue- and white-collar manufacturing workers, respectively, in foreign-owned multinational firms. For American workers in multinationals with foreign investment backing the wage premiums are 7 percent and 2.5 percent, respectively. The productivity advantages of globally engaged firms benefit American workers, insofar as high and rising labor productivity is the foundation for gains in real wages economy-wide.

Taking Stock of the Benefits of Trade to America

The decades of American efforts to advance trade liberalization described above have generated substantial gains for the country overall. On the consumption side, households have enjoyed lower product prices and greater product variety. On the production side, firms have more efficiently allocated resources by focusing on areas in which they have a comparative advantage. Those firms directly engaged in international commerce tend to be more innovative, more productive, and pay higher wages and benefits to their workers. Overall, there is substantial evidence that trade has contributed to high and rising living standards for the average American.

Having discussed the different ways through which freer trade benefits America, the bottom-line question is how much has America benefited in total from decades of trade liberalization? Studies have estimated that the annual payoff from U.S. trade and investment liberalization to date, including from the Tokyo Round, Kennedy Round, and Uruguay Round, NAFTA, and other FTAs, is over \$5,000 per capita or \$20,000 for an average American family of four. These gains arise through many channels: higher long-term levels of trade exposure in goods and services that come from trade and investment liberalization; increased product variety; more efficient allocation of resources; and better transportation and communication technology. Some economists have conjectured that trade liberalization alone has accounted for about half of these gains, which implies that the annual income gain from trade liberalization to date is over \$10,000 for an average American family of four.

Box 7-2 includes a discussion of the impacts of international trade on labor markets. The effects of trade on the environment are discussed in Box 7-3.

Box 7-2: Trade and Labor

Job growth in America is driven largely by demographics—population growth and choices about labor-force participation—and by macroeconomic policies that affect, in particular, the business cycle. As the chart below shows, total employment has closely tracked the number of people in the labor force (employable people) since 1960, which in turn has closely tracked the overall U.S. population. Import competition has the potential to generate job losses where firms fail to adjust their operations to meet new competitors. International trade can also create better, higher-paying jobs in other industries. As discussed in the chapter, American jobs in globally-engaged firms (firms that are engaged in international trade or investment) are on average better and higher-paying than are jobs in purely domestic firms.

The dynamic U.S. economy creates and eliminates millions of jobs each year. The enormous turnover in the U.S. labor market is a reflection of the continuous stream of entry, exit, and resizing of firms in our ever-changing economy. On average over the past decade, the economy has had a net creation of nearly 2 million jobs each year. This net increase has been the result of approximately 17 million jobs created and 15 million jobs eliminated each year. International trade is one of the factors behind job turnover, along with changes in consumer tastes, domestic competition, productivity growth, and technological innovation. Survey data from the Bureau of Labor Statistics show in layoffs of 50 or more people between 1996 and 2004 less than 3 percent were attributable to import competition or overseas relocation. Moreover, studies have shown that the rate of job creation in globally engaged companies is faster than the overall private-sector rate, and that trade-related dislocations on average do not involve longer unemployment duration or lower re-employment earnings than do dislocations from other causes.

Any job loss involves hardship, and any job change can involve challenge. The President has outlined ways to help people gain new skills in fields where jobs are being created.

It is often asserted that international competition pressures American earnings. In today's economy, education is valued more than ever and is a key determinant of worker earnings. Since the late 1970s, the returns to education have been rising in the United States, despite the fact that the supply of educated workers has also grown rapidly,

Box 7-2 — continued

Labor Force and Employment, 1950-2004

Employment closely tracks the number of people in the labor force.

Millions of People



Source: Department of Labor (Bureau of Labor Statistics).

suggesting that the demand for skills and education has grown even faster than supply. There is now a large body of empirical research exploring the causes of rising wage inequality across skills. There is broad consensus that trade has marginally contributed to rising wage inequality by placing a higher premium on skills and education. This contribution has been small compared to other factors such as the advent of new technologies that demand higher levels of skill.

It is important that the United States help our workers thrive in a competitive world. The President has said he will not be satisfied until everyone who wants to work can find a job. At the macroeconomic level, monetary policy can aim to achieve maximum sustainable employment with low inflation—irrespective of the trade situation. At the microeconomic level, constructive policies can help students and workers, including displaced workers—regardless of the cause of displacement—train for and find good work in the 21st century. The President has proposed a number of measures to improve job training, including Community-based Job Training Grants and Career Advancement Accounts (for further discussion, see Chapter 2).

Box 7-3: Trade and the Environment

A nation's environmental policies are largely determined by domestic factors. The most direct mechanism through which trade liberalization could affect environmental quality is through changes in the composition of industries or the scale of industrial or agricultural output. Trade means greater specialization, potentially increasing the concentration of polluting industries in some countries (so-called pollution havens) and decreasing it in others. On the other hand, multinational corporations from industrialized countries that set up operations in lesser-developed countries often bring a higher level of environmental performance with them. There is little or no empirical evidence directly linking trade liberalization to environmental changes.

Trade can affect the environment indirectly as well, both positively and negatively. Increased trade can lead to higher incomes, and as incomes rise, the demand for improved environmental quality rises. Another indirect effect is the influence of trade on the rate of economic growth, which could either decrease pollution (due to the use of cleaner technologies through capital stock turnover fueled by economic growth) or increase pollution (due to increased consumption).

While it is widely recognized that international trade policy measures are usually not the best method for achieving environmental objectives, recognition of the importance of the issue has resulted in a number of significant policy and institutional responses, both nationally and multilaterally. For instance, the environmental side agreements of NAFTA established the North American Commission for Environmental Cooperation to undertake capacity-building projects and to put procedures in place that help to monitor each country's effective enforcement of environmental laws. Active participation by governments and institutions is a necessary component of the success of such efforts.

FTAs can provide a basis for enhanced bilateral cooperation on environmental issues. Environmental provisions in NAFTA and U.S. free trade agreements require each country to effectively enforce its own environmental laws, and strive to ensure that failure to enforce these laws does not affect trade or investment. These agreements are accompanied by separate environmental cooperation agreements or arrangements intended to take advantage of the closer economic ties and broadened environmental cooperation that goes beyond the trade sphere. Although some criticize trade agreements for a failure to do even more to advance environmental policy objectives, others acknowledge the significant benefits associated with the core obligations and cooperation mechanisms.

The Policy Scene Today: Avenues to Further Liberalization

Trade liberalization to date has had substantial benefits. Still, barriers to international trade and investment remain and limit growth opportunities for many countries. With the United States accounting for just 5 percent of the world's population, 95 percent of the potential consumers of U.S. goods and services live outside our borders. The prospective gains from further liberalization, particularly in services (e.g., finance, insurance, information technology, and professional and business services), are substantial for the United States and our trading partners through greater efficiency of production and higher national incomes. The extent to which different countries experience gains depends on both the range of sectors that are liberalized and the extent of liberalization within each sector. The United States is pressing for freer trade, especially in services, through bilateral, regional, and multilateral agreements.

Prospective Gains from Further Liberalization

Prospective Gains for the United States

The prospective gains for the United States from further trade reform are substantial. One study suggests that global free trade in manufacturing and agriculture would generate annual economic gains of over \$16 billion for the United States, or roughly \$220 for the typical family of four. The gains from removing all remaining barriers to trade in services are substantially larger, amounting to about an additional \$520 billion for the United States, or over \$7,000 for the average American family of four. This is additional income each year that will not be available in the absence of trade reform. These income gains would be fully realized in about a decade from the date of liberalization. These large gains reflect the United States having a comparative advantage in services sectors and the high barriers to services trade in other countries, which are often investment restrictions that effectively block the main conduit for trade in services. These restrictions include limits on the number of service providers, minimum local-content requirements that limit the participation of foreign firms, nontransparent and burdensome standards and licensing procedures, and discriminatory access to distribution networks.

Prospective Gains for the Rest of the World

Further liberalization in trade would bring significant global economic gains, particularly for developing countries. One study reports that the reduction of all remaining barriers to trade in services would generate over

\$1.5 trillion in income for the world. For full trade liberalization in agriculture and manufactured goods, the World Bank reports that reducing trade barriers would generate about \$290 billion of additional income to the world economy each year once the full effects of liberalization are realized, about a decade out. The income gains are even higher at \$460 billion with more generous assumptions of trade's effect on economic growth. Nearly half of those income gains would go to developing countries. Various studies find that at least half of the developing-country gains would be obtained from agriculture trade reform by industrialized countries (including the United States), including tariff reductions and the elimination of subsidies and domestic support programs. (Agricultural trade reform is discussed in detail in Chapter 8.)

Debt relief and foreign aid can help to reduce poverty, but trade is a more powerful tool. For instance, in 2004, industrialized countries spent over \$78 billion on development assistance to poor countries and industrialized countries are currently considering debt relief of \$56 billion. Even the conservative estimate of the \$140 billion effect of trade liberalization to developing countries exceeds both assistance and debt relief combined. Studies show that reducing barriers to global trade has the potential to lift hundreds of millions out of poverty. Agriculture liberalization is particularly important since roughly 75 percent of the world's poor live in rural areas and farmers constitute the majority of the poor in developing countries.

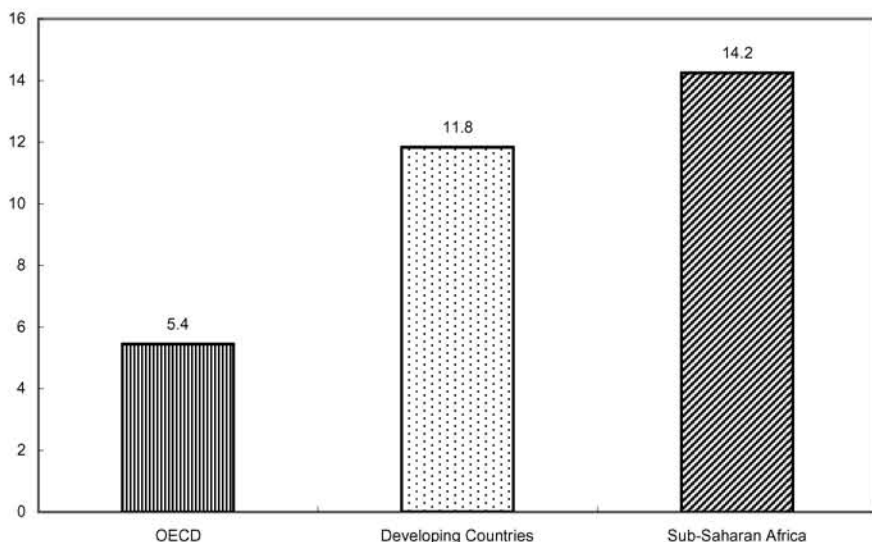
The gains from integrating developing countries into the global economy are not one-sided. As developing countries increasingly participate in the global economy, industrialized countries benefit from increased export and investment opportunities in those markets. Over the past decade, U.S. export growth to developing countries exceeded the rate to industrialized countries. Yet tariffs and other trade barriers in developing countries remain high (Chart 7-3). Realizing these market opportunities and encouraging development in these countries requires further trade liberalization efforts while promoting transparency, good governance, and sound institutions, all necessary building blocks for economic growth.

Persuading developing countries to reduce trade barriers continues to be an important objective for the United States. As developing countries become more active participants in the global economy, they experience higher rates of economic growth and are better able to reduce poverty. Studies show that over the past two decades, developing countries that have been more open to free trade have experienced higher rates of economic growth. During the 1990s, per capita GDP in developing countries that liberalized more increased 5 percent compared to 1.4 percent growth in other developing countries. China's integration into the world economy is discussed in Box 7-4.

Chart 7-3 Average Tariffs Across Countries

Developed countries, on average, have lower tariffs than developing countries.

Percent



Note: Tariffs are applied average rates.

Source: World Trade Organization, *World Trade Report 2005*.

Box 7-4: U.S.-Asia Trade Relationship

The robust postwar economic performance of many Asian countries has driven the strong U.S.-Asia trade and economic relationship. In recent years Asian economies have experienced some of the world's highest growth rates and will continue to be key export markets for U.S. firms. Outside of South Asia, trade with the Pacific Rim region represents about 30 percent of U.S. trade with the world. The United States imports different items from the Asian region than it exports. The top imports from the Pacific Rim include electrical machinery, automobiles, toys, furniture, clothing, and footwear. The top U.S. exports to that region include aircraft, chemicals, plastics, agricultural products, automobiles, and pharmaceutical products.

U.S.-China Trade

Since 1995, U.S. trade with China has represented an increasing share of U.S. total trade, reflecting some substitution away from other Pacific Rim trading partners toward China. The United States imports different items from China than it exports to China. In 2004, top import items from China included a wide range of consumer goods, such as toys, sporting goods, apparel, and footwear. Top U.S. export items to China included a number of intermediate components and machinery,

Box 7-4 — continued

aircraft, soybeans, and cotton. Many imports from China now take the place of goods previously imported from other countries. China increasingly is a large and growing market for U.S. goods and services. As the chart below shows, since China's accession to the WTO, U.S. exports to China have risen faster than exports to the rest of the world.

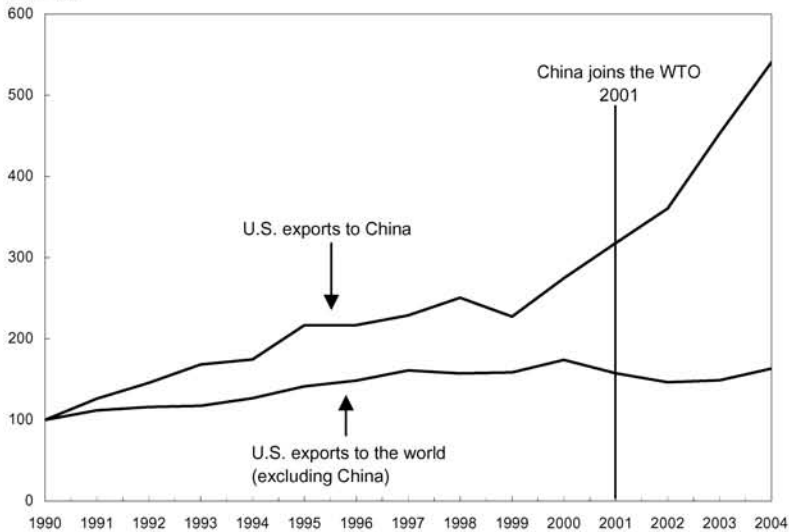
Engaging China

The U.S.-Asia trade and economic relationship offers vast opportunities for citizens in all of these countries to prosper, however, China's integration into the global economy will not come without challenges. For instance, WTO membership has offered China new benefits, such as Permanent Normal Trade Relations with the United States and access to the WTO's rules-based dispute-settlement mechanism. China's WTO membership also brings new responsibilities, such as improving the protection of intellectual property, full compliance with trade agreements, and continued progress toward a flexible, market-based exchange-rate regime. China has made strides toward economic reform at all levels of government, but there are areas that require further progress. The United States will continue to work with China to assist its integration as a responsible stakeholder in the international economy and to ensure that bilateral economic relations are mutually beneficial.

U.S. Exports to China and the World

U.S. exports to China have been growing faster than to the rest of the world.

1990 = 100



Note: Index of exports in 2000 U.S. dollars.

Source: Department of Commerce (Bureau of the Census).

Avenues for Further Liberalization

Countries are increasingly employing negotiations at the bilateral, regional, and multilateral levels to achieve further liberalization. These avenues are not mutually exclusive. The United States employs a multi-faceted approach, and in recent years has signed a number of bilateral and regional free trade agreements. These agreements set rules for trade, increase market access for firms, and strengthen the effective enforcement of intellectual property rights and environmental and labor laws. Other trading partners such as the European Union (EU) have pursued an even greater number of bilateral and regional agreements. The WTO nevertheless remains the most important forum for trade liberalization due to its global reach and the interdependence of the world economy.

The general consensus on the WTO among academics and practitioners is that the organization has facilitated increased trade and openness. By establishing a rules-based system, the organization provides a forum for all members to resolve trade disputes and offers a greater voice to developing countries in the establishment of global trade rules. These rules help to foster better business climates, particularly among developing countries, which can help to reduce corruption and attract more foreign direct investment. The United States fully supports the role of the WTO in promoting a rules-based global trading system, opening markets, and encouraging economic growth.

The 149 WTO members are currently engaged in the Doha Development Round of negotiations, which recognizes that global trade expansion can make a significant contribution to spurring economic growth and reducing global poverty. The Doha Round focuses on better integrating developing countries into the international trading system and enabling them to benefit from increased trade.

Moving Beyond Goods Trade Liberalization

To date, most trade liberalization has been in the form of reduction in barriers to goods trade. Using existing trade agreements and partnerships, trade and investment ties can be strengthened to include services and other nontariff measures that limit international commerce. This section discusses how the United States is pursuing deeper economic cooperation across North America and with the European Union.

Services Liberalization

From telecommunications and finance to health and education, services are the single largest sector in most industrialized and many developing countries. Not only do services provide the bulk of employment and income in many countries, but services provide critical input for the production of other goods

and services. An in-depth look at financial services illustrates many of the key issues involved in liberalizing trade in services.

The unprecedented growth of global financial markets in recent years has given prominence to the issues associated with financial services liberalization. Liberalizing international trade in financial services can be a market-based means to strengthen financial systems. It is often an important catalyst in improving the quality of capital flows through exposure to foreign competition and in strengthening financial systems—particularly in developing and transitioning economies. Enhanced financial services trade can improve technology transfer and encourage better risk management across borders. Foreign competition challenges domestic firms to improve the quality of their financial services through broader opportunities for trade and portfolio diversification. This results in more consumer choice and competitive pricing.

Financial services liberalization for developing countries offers many possibilities for strengthening weak domestic financial systems through trade openness, competition, and sound regulation. Countries with fully open financial service sectors grow on average one percentage point faster than other countries. Foreign-backed financial institutions in developing countries often possess a greater ability to lend to those countries during economic downturns and thereby stabilize capital flows in times of crisis. Foreign banks that can extend credit to local businesses can be critical for stabilizing developing-country economies in the absence of more limited capacity of domestic financial intermediaries.

The General Agreement on Trade in Services (GATS) of the WTO is the most comprehensive framework to date that supports national programs of financial services liberalization within an international context. Insurance, banking, and financial services trade exists primarily in two forms: cross-border trade and commercial presence. In cross-border trade, domestic consumers purchase services from a foreign supplier abroad. In the case of commercial presence, a foreign supplier establishes itself in a country through direct investment.

U.S.-EU Economic Initiative

Trade and investment ties between Europe and the United States have been crucial in each region's economic growth for several decades. Trans-Atlantic trade is mostly free in terms of border taxes, with the exception of the agricultural sector. However, there remain a host of nontariff measures and regulatory divergences that hinder U.S.-EU trade and investment. In 2005, the United States and the European Union launched a trans-Atlantic economic initiative, which aims to promote regulatory cooperation and mutual recognition of standards, enhance trade in services, stimulate open and competitive capital markets, and promote innovation, among other economic-cooperation goals.

In order to enhance trade in services, the initiative calls for U.S. and European authorities to work with regulators and professional associations to identify sectors where the potential exists to achieve mutual recognition of professional qualifications. For instance, an agreement in architectural services might allow American architects to provide their services to European developers without having to navigate a complex and often nontransparent regulatory and licensing process. Underlying these goals to promote trans-Atlantic commerce is a commitment to greater cooperation beyond the reduction of traditional trade barriers.

Strengthening Economic Cooperation Across North America

NAFTA achieved important trade liberalization across the United States, Canada, and Mexico, and has laid the foundation for further economic cooperation in trade, investment, and other mutual interests such as immigration and security. Through the North American Security and Prosperity Partnership, the United States is working with the governments of Canada and Mexico to promote such economic cooperation. This “NAFTA-plus” initiative aims to eliminate nontariff barriers, streamline regulatory processes, expand duty-free treatment by liberalizing the rules of origin, and promote free and secure electronic commerce. Heightened security concerns since September 11, 2001, have resulted in greater port inspections, longer shipment times, and more-frequent delays. The imposition of security fees and increased inspections on NAFTA commerce can increase trade costs, adversely affecting businesses that have integrated their operations on a regional basis (such as the auto industry). This initiative also aims to harmonize safety standards for trade, streamline checkpoint operations, and make the movement of legitimate and low-risk traffic across North American borders more secure and efficient.

Conclusion

The expansion of international trade and investment over the past two decades has created an increasingly interdependent global economy. Achievements in trade liberalization have had substantial payoffs for the United States and our trading partners. With just 23 members (or “contracting parties”) in 1948, the purview and membership of the GATT have grown dramatically. Today the WTO (the formal international organization of the GATT) has 149 members with many countries eager to join. While this increased engagement by countries in international commerce presents immense opportunities for U.S. consumers, workers, and firms, reaching consensus among all these countries on further reductions in trade

barriers can be difficult. Like many other countries, the United States has pursued multilateral, regional, and bilateral agreements to achieve its goals. These avenues all lead to the same destination of more-open markets and greater economic growth. Existing trade partnerships and formal agreements can be platforms for further economic cooperation in areas such as services and investment. Recognizing the payoff to date and the prospective gains from further liberalization, the United States is committed to working with all countries to open markets and create favorable conditions for economic growth both here and abroad.

The U.S. Agricultural Sector

In 2005, the Federal government spent approximately \$20 billion on Agricultural support payments in a sector forecast to produce approximately \$270 billion of output in 2005. In addition, the United States maintains barriers to the import of some commodities, and these barriers raise the domestic prices of these commodities relative to world prices. To what extent do these payments and trade barriers serve a public purpose? Are they needed to maintain a healthy U.S. agricultural sector? Could alternative policies achieve this goal? This chapter addresses these and other questions.

Today's agricultural commodity support programs are rooted in the landmark New Deal legislation that followed the agricultural depression of the 1920s and 1930s. These programs were designed to sustain prices and incomes for producers of cotton, milk, wheat, rice, corn, sugar, tobacco, peanuts, and other crops, at a time when a large portion of the U.S. population was engaged in farming. Changing economic conditions and trends in agriculture since then suggest that many of the original motivations for farm programs no longer apply. For example, the increasing reliance of farm families on income earned from sources other than their farms and a shift toward market-oriented farm policies have made farms and commodity markets less vulnerable to adverse price changes than before. These changes imply that moving away from traditional commodity support programs today would have a much smaller impact on farm household income than in previous decades. Nonetheless, substantial government support of agriculture remains.

A more economically efficient farm policy would reflect contemporary economic conditions, environmental needs, and public values. Economic efficiency would be served by policies that are cost-effective and that give farmers greater opportunity to respond to market signals. Revising government policy to better meet these objectives would help unleash more of the innovative energy that has long characterized American agriculture. U.S. agriculture can successfully compete in a global marketplace that has been freed of domestic support and barriers to trade. The key findings of this chapter are:

- Most farmers do not benefit from commodity subsidies.
- Support to agriculture can be provided in many forms that are potentially less market- distorting than existing commodity subsidies.

The U.S. Farm Sector Has Evolved Dramatically Over Time

In the 1930s, farms accounted for a sizable share of U.S. employment and gross domestic product (GDP), but per capita farm income was only one-third the per capita income of the remaining population. Commodity programs were intended to reduce this disparity by sustaining farm household income, particularly in the face of adverse changes in agricultural prices. For instance, in the early 1930s farm household incomes were at the mercy of year-to-year fluctuations in farm prices. Commodity price support programs, which provided *price floors* (minimum prices) for agricultural producers, effectively insured them against adverse price swings. Proponents of these programs argued that they had macroeconomic benefits because they maintained rural purchasing power in times of general economic weakness. Many of today's basic Federal farm policies were established in the 1930s, and at the time, they were reasonably matched to this overall economic picture. Since that time, however, the U.S. agricultural industry has evolved dramatically.

As Table 8-1 shows, in the 1930s farm households accounted for 25 percent of the U.S. population and generated approximately 8 percent of GDP. Today they account for only 1 percent of the population (25 times lower than in 1930, as a percentage of total population) and generate approximately 1 percent of GDP. Over the same period, the rural share of the population has fallen far less (approximately two times lower than in 1930, as a percentage of total population), suggesting that rural areas are less dependent on farming's contribution to the rural economy. Our agricultural sector is still vital to our country, but due to both growth in other sectors of the economy and rapid gains in agricultural productivity that have lowered the prices of agricultural products, it has become a smaller share of the U.S. economy.

Astonishing progress in agricultural productivity growth likely explains much of the structural change in U.S. agriculture (Chart 8-1). Growth in agricultural total factor productivity averaged 2.1 percent annually between 1950 and 2002. In comparison, productivity growth in private nonfarm business over the same period averaged 1.2 percent annually. Technological progress and growth in farm productivity permit a smaller labor force to supply the agricultural needs of the country at ever lower cost. As a result, agriculture's contribution to total U.S. GDP has declined over time even though physical production has been rising (Chart 8-2).

TABLE 8-1.— *100 Years of Structural Change in U.S. Agriculture*

	1900	1930	1945	1970	2000
Number of farms (millions).....	5.7	6.3	5.9	2.9	2.1
Average farm size (acres).....	146	151	195	376	441
Average number of commodities produced per farm.....	5.1	4.5	4.6	2.7	1.3
Farm share of population (percent).....	39	25	17	5	1
Rural share of population (percent).....	60	44	36 ^b	26	21
Farm share of workforce (percent).....	41	22	16	4	2
Farm share of GDP (percent).....	na	8	7	2	1 ^c
Off-farm labor ^a	na	100 days	27%	54%	93%

na= not available.

^aOff-farm labor measures the extent to which members of farm households work in other sectors besides farming. 1930, average number of days worked off-farm; 1945, percent of farmers working off-farm; 1970 and 2000, percent of farm households with off-farm income.

^bData for 1950.

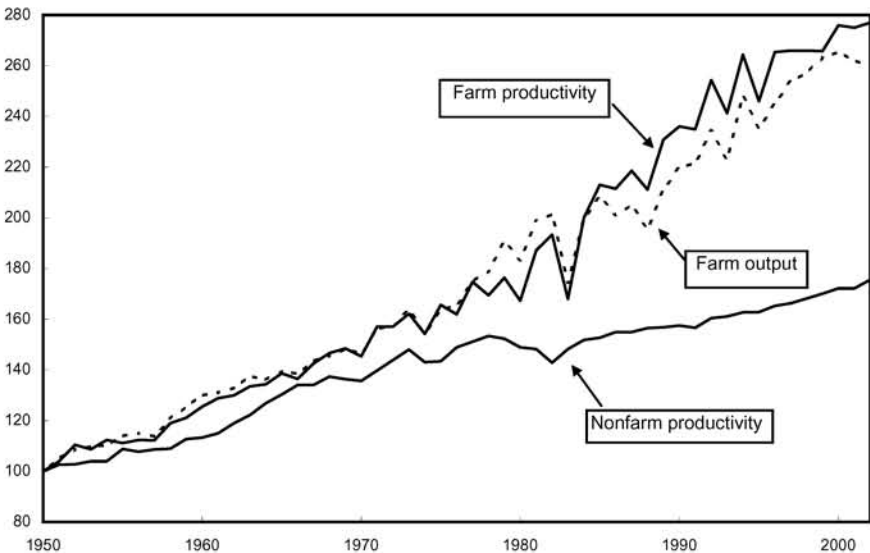
^cData for 2002.

Sources: Department of Agriculture (Economic Research Service) and Department of Commerce (Bureau of Economic Analysis).

Chart 8-1 **Farm Sector Inputs, Output, and Total Factor Productivity**

Gains in farm productivity have driven increases in farm output and exceed nonfarm productivity gains.

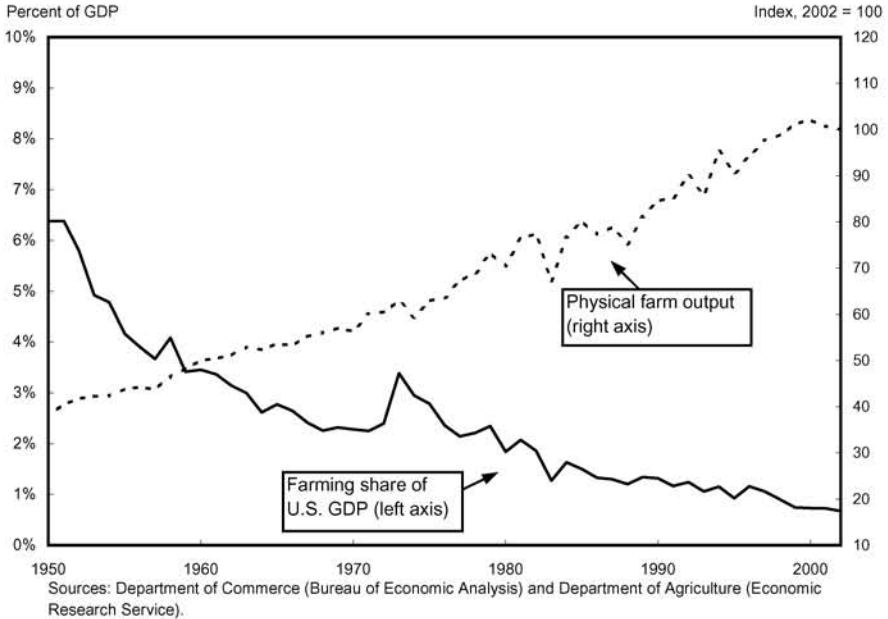
Index, 1950 = 100



Sources: Department of Agriculture (Economic Research Service) and Department of Labor (Bureau of Labor Statistics).

Chart 8-2 **Farming Output and Share of U.S. GDP**

Farm output has increased, while farming as a share of U.S. GDP has declined.



The Average Farm Payment Recipient Is No Longer Poor

Fifty years ago, average household income for the farm population was approximately half that of the general population. Today, however, the average farm household tends to be better off than the average American household; in 2004, farm households earned about 35 percent more than the U.S. average household income.

While on average farm households earn more than other Americans, the relative contribution of farm income (income from farming activities, including crop, livestock, and other farm-related income, and government farm support payments) to total farm operator household income (income from all sources—farm and nonfarm—that is earned by a household that operates a farm) varies by farm size. Households operating the “rural residence farms” (Table 8-2 shows the farm size classifications) earn more than the U.S. average family income even though their net cash income from farming is negative (that is, the expenses from operating the farm exceed the gross revenues) on average. The income from these farms is unlikely to be sufficient to support a family, and households operating these farms receive their income from other sources. Households operating intermediate farms have on average positive net cash income from their farming operations, but most household income comes from sources other than farming. Households

operating commercial farms have average household income over three times higher than the U.S. average family income in 2004, with most of their income coming from farming.

Production and Government Payments Are Concentrated on Large Farms

The structure of farming continues to move toward fewer, larger operations producing the bulk of farm commodities, complemented by a growing number of smaller farms earning most of their income from off-farm sources. As Table 8-3 shows, most farms in the United States are still small farms or “rural residence farms,” but they produce only a small share of total agricultural output and receive only a small share of direct agricultural subsidy payments. Most production and government payments are now associated with intermediate and commercial farms, particularly the latter, which account for a relatively small percentage of the total number of U.S. farms but receive over half of direct payments.

TABLE 8-2.— *Farm Income and Farm Operator Household Income by the
USDA Farm Size Classification, 2004*

Item	Rural residence farms	Intermediate farms	Commercial farms	All farms
Farm operator households (total number)	1,373,956	529,071	157,795	2,060,822
Average gross cash per farm income per farm operator household (dollars) ^a	15,343	73,053	751,696	86,540
	<i>Percent of average gross cash farm income per farm operator household by source</i>			
<i>Crop, livestock, and other farm-related income</i>	<i>91.8</i>	<i>92.7</i>	<i>95.5</i>	<i>94.5</i>
<i>Government payments</i>	<i>8.2</i>	<i>7.3</i>	<i>4.5</i>	<i>5.5</i>
	<i>Average per farm operator household (dollars)</i>			
Total cash farm expenses	15,980	58,423	525,655	65,902
Net cash farm income	-638	14,630	226,041	20,638
Farm operator household income ^b	75,316	64,789	191,115	81,480

Source: Department of Agriculture (Agricultural Resource Management Survey).

^aGross cash farm income is income from crop, livestock, and other farm-related income, including agricultural subsidy payments.

^bFarm operator household income is income from all sources, farm and nonfarm related, earned by the farm household.

Note: **Rural residence farms.** Small farms with agricultural sales less than \$250,000—whose operators report they are retired or have a major occupation other than farming. Rural residence farms also include limited-resource farms, regardless of the occupation of their operator. (Limited-resource farms have sales less than \$100,000 and are also operated by households with low household income during the two previous years.)

Intermediate farms. Small farms with sales less than \$250,000—whose operators report farming as their major occupation. This category excludes farms classified as limited-resource farms, even if their operators report farming as their major occupation.

Commercial farms. These comprise farms with annual sales of \$250,000 or more.

TABLE 8-3.— *Distribution of Agricultural Production and Government Payments by the USDA Farm Size Classification, 2003**

Item	Rural residence farms	Intermediate farms	Commercial farms
Farms (number)	1,429,953	502,771	188,095
Farms (percent of total farms)	67	24	9
Percent of total value of agricultural production.....	9	19	72
Percent of total direct government payments received	17	32	51

Source: Department of Agriculture (Agricultural Resource Management Survey).

*See bottom of Table 8-2 for the definitions of the USDA Farm Size Classifications, but with the inclusion of farms organized as nonfamily corporations or cooperatives, as well as farms operated by hired managers.

The United States is not the only country in which subsidy payments are concentrated among a relatively small portion of farms receiving commodity subsidy payments. Data on the distribution of payments by farm size are relatively hard to come by for most European Union (EU) countries. However, in 2001 in France, farms of approximately 500 acres or more represented 2 percent of farms and received 11 percent of direct payments for arable crops (grains and oilseeds), while small farms (25 to 50 acres) represented 19 percent of farms but received 7 percent of direct payments for arable crops. While the EU is currently in the process of converting most of its various forms of direct farm payments into “single farm payments” that will be largely independent of production, the direct farm payments will be based on payments historically received by a farm. Hence, it is likely that direct payments to European farmers will remain concentrated among a relatively small portion of farms.

Issues in Current U.S. Farm Policy

In the United States, producers of bulk commodities, such as cash grains (wheat, rice, and corn), cotton, oilseeds, and peanuts, and producers of several other minor crops are eligible for commodity support in various forms, including fixed direct payments, countercyclical payments, and marketing loan program benefits (whose particulars will be discussed in a later section). Dairy, sugar, and (until 2004) tobacco prices are also supported through production and import control programs.

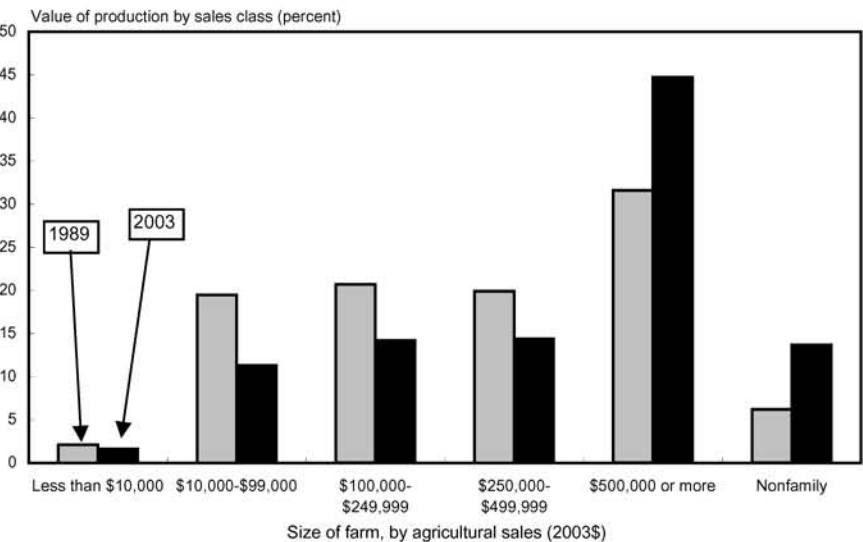
Agricultural Production and Farm Program Benefits Are Increasingly Concentrated

Because of differences in farm size and types of commodities produced across farms, the distribution of government payments is unbalanced. Among the factors affecting the allocation of government payments are farm size (acreage), location, and types of commodities produced.

Less than half of the Nation's 2.1 million farms receive government payments—only 40 percent received government payments (including income support and conservation payments) in 2003. Direct government payments on crops eligible for commodity support reach only about 500,000 farms (around 25 percent of all farms). Even for farms that receive payments, government payments typically represent a small share of gross farm income (revenue from farming activities, including crop, livestock, and other farm-related income, and government farm support payments) and an even smaller share of farm operator household income. Government payments accounted for only about 5 percent of receipts for commercial farms (Table 8-2).

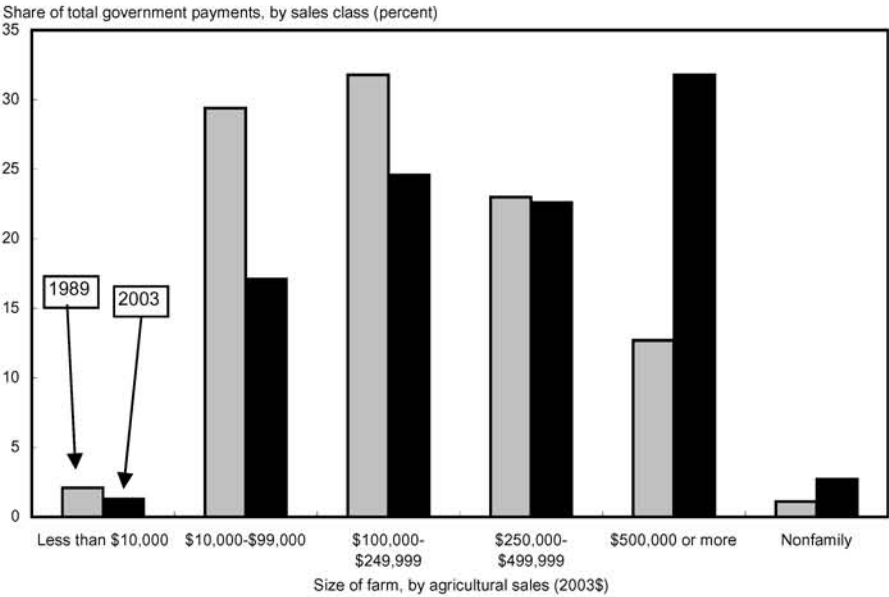
Most program payments go to larger farms, because program commodity production is concentrated on larger farms. While commercial farms received approximately half of government payments in 2003, they accounted for only 15.5 percent of farms receiving payments, and the average household income of their operator is almost three times higher than U.S. average household income. The largest of the commercial family farms (those with gross annual sales of \$500,000 or more) received 27 percent of payments even though they account for 5.5 percent of farms receiving payments. Some of the largest farms in terms of value of production produce livestock or fruits and vegetables and thus may not receive any government program payments. As Charts 8-3 and 8-4 show, both production and program payments have become increasingly concentrated over time, with notable shifts toward larger farms even over the last decade.

Chart 8-3 Value of Agricultural Production by Farm Size (1989 versus 2003)
Agricultural production is shifting toward larger farms.



Note: Non family farms comprise those farms organized as nonfamily corporations or cooperatives, as well as farms operated by hired managers.
Source: Department of Agriculture (Economic Research Service).

Chart 8-4 **Government Commodity Payments by Farm Size (1989 versus 2003)**
Government commodity payments are shifting toward larger farms.



Source: Department of Agriculture (Economic Research Service).

The share of program participants is highest in regions where production of corn, oilseeds, wheat, rice, and cotton is concentrated. Cotton and rice farms reported the highest average payment level. In 2003, cash grain (wheat, rice, corn, barley, oats, and sorghum) and soybean farms received 49 percent of total payments even though they represented only 21 percent of the value of total agricultural commodity sales. Farms that receive no payments typically specialize in the production of nonprogram commodities such as meats, vegetables, fruits, and nursery products.

Farmers Today Have Many Options for Managing the Risks They Face

Farmers face many risks. The uncertainties of weather, crop yields, prices, government policies, global markets, and other factors can cause wide swings in farm income. Furthermore, farm income is more variable than income from off-farm activities.

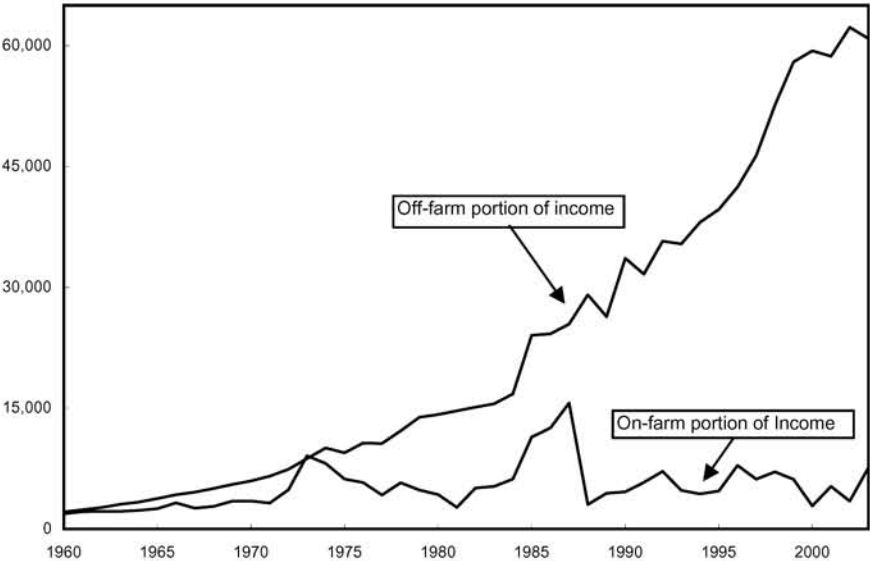
Risk management involves choosing among many options for reducing the financial effects of such uncertainties. In addition to participating in government commodity programs that are available for certain commodities, farmers today have private options for managing risk that were not available when commodity price support programs were introduced. For instance, the

growth of futures and options markets provides a market-based method for farmers to protect themselves against short-term price declines. Other private means to stabilize farm incomes include saving, borrowing, diversifying among different types of crops and livestock, contracting farm output with processors at assured prices, crop insurance and total revenue insurance, utilizing a wide range of farm management practices that reduce crop loss (e.g., irrigation, pesticide use), leasing out farmland, and taking advantage of expanded opportunities for earning nonfarm income.

The sources of income for farm households are increasingly diversified, which means many of them are less vulnerable to the volatilities of farm income. By 2000, 93 percent of farm households earned off-farm income, including off-farm wages, salaries, business income, investments, and Social Security. Off-farm work has played a key role in raising farm household income, which, as already noted, now exceeds the national average. Chart 8-5 shows the increasing importance of nonfarm income for farm households in the United States.

While farm household incomes have become more diversified, farm operations have become increasingly specialized: In 1900, a farm produced an average of about five commodities; by 2000, this average had fallen to about one per farm. This change reflects not only the production and marketing efficiencies gained by concentration on fewer commodities, but also the effects of farm

Chart 8-5 Composition of U.S. Farm Household Income by Source (household average)
The ratio of off-farm income to on-farm income has been rising over time.
Dollars (nominal)



Source: Department of Agriculture (Economic Research Service).

price and income policies that have reduced the risk of depending on returns from only one crop or just a few crops. Farms would likely cope with decreases in commodity subsidies by increasing the number of different commodities they produce and by the other income stabilizing strategies already discussed.

Economic Costs of Commodity Support Programs

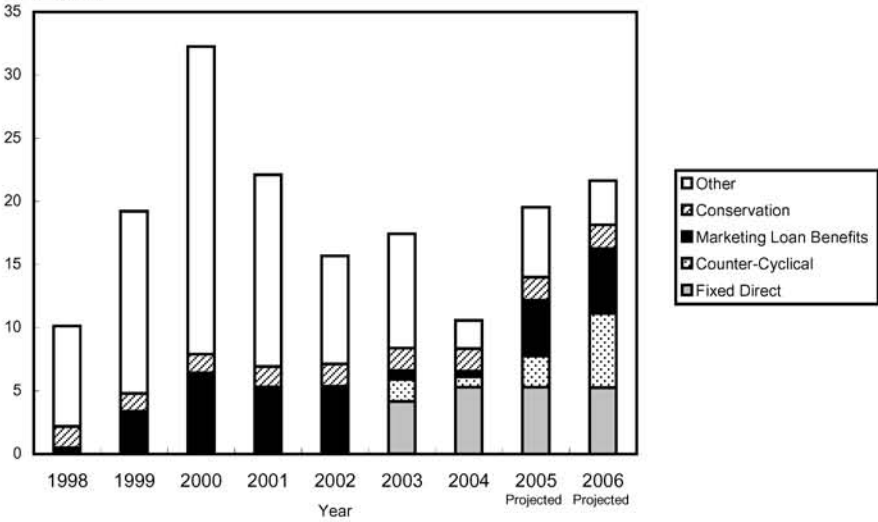
Despite the decreasing share of agriculture in U.S. GDP, the decreasing share of farm income in total farm household income, and despite the fact that the average farm household is no longer poor, U.S. farmers continue to receive billions of dollars in subsidy payments from U.S. taxpayers every year (Chart 8-6). Total payments to farmers from the Federal government were approximately \$20 billion in 2005 and are projected to be approximately \$21 billion in 2006. This constitutes about 6 percent of the U.S. Federal budget deficit for 2005 of \$319 billion.

In addition, these subsidy payments can cause market distortions by stimulating more production than would occur without the subsidies. To the extent that payments are tied to production and prices, they send market signals to farmers that differ from those they would receive from a market operating free from government intervention. These distorted price signals lead to an economically inefficient allocation of resources both within the agricultural sector and across other sectors of the economy. The link between agricultural support payments and markets varies among programs. For instance, fixed direct payments (FDPs) are based on a farm's historic production and are fixed lump-sum payments. Countercyclical payments (CCPs) are based on historic production but the per acre payment varies with changes in the current market price. Marketing loan benefits (MLBs) are calculated based on current production and prices. Although there is some debate over the relative levels of the market distortions caused by these direct payments, FDPs are generally believed to be minimally market-distorting per dollar of expenditure, followed by CCPs, and finally MLBs, which are generally perceived to result in the most market distortion per dollar of expenditure.

While these domestic support policies increase costs to taxpayers, they are only part of the support that agriculture receives and these other forms of support can also cause market distortions. In particular, for some commodities, market price supports such as tariffs impose additional costs on U.S. consumers of commodities by raising their domestic prices relative to world prices and thus reducing consumer purchasing power. Such support is especially high as a percentage of the value of the commodity in the case of sugar. Because of the U.S. tariff rate quota system on sugar imports, the domestic price of sugar has been approximately double world sugar price over the last few years. An estimate by the OECD found that the cost of U.S. sugar policies to U.S. sugar consumers due to increased sugar prices was \$1.5 billion in 2004.

Chart 8-6 **Net Direct Payments to Farmers**

Billion Dollars



Source: Department of Agriculture (Farm Services Agency).

In general, U.S. commodity support programs promote overproduction of commodities in the United States and hurt countries that could benefit from exporting these commodities to the United States. The existence of these U.S. programs in turn has prompted some U.S. trading partners to insist that we reduce these market-distorting programs in exchange for concessions important to United States trade in services and manufacturing. At the same time, as discussed in the next section, U.S. agriculture increasingly depends on the availability of foreign markets.

This section focused on distortions of market for land-based food resources. For an example of government policy that increases economic efficiency through market-based management of marine food resources, see Box 8-3 at the end of this chapter.

Trade Policy Issues

The potential economic gains from further trade liberalization in agriculture as well as in manufactured goods and in services are large (see Chapter 7, The History and Future of International Trade, for more information). Trade ministers are working at the World Trade Organization to resolve differences about how to reform various protections for agriculture, a key issue that must be

addressed before negotiations in other areas can proceed. Areas of significant policy interest are the economic impacts of agricultural trade liberalization and the potential impact on the environment and the supply of amenities.

Trade Is Essential to the U.S. Agricultural Sector

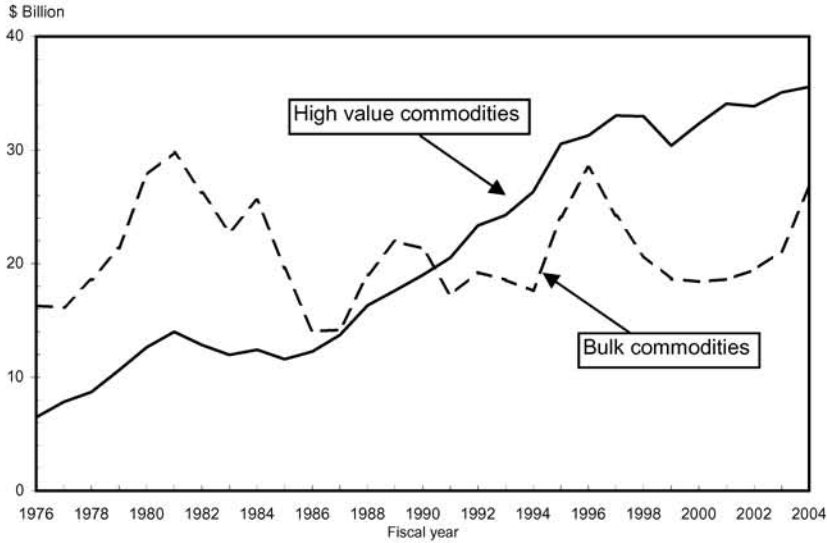
Trade is important for all major sectors of the U.S. economy, and agriculture is no exception. The quantity of agricultural goods exported from the United States has grown dramatically over the last half century, and is approximately eight times higher today than in 1950. With the productivity of U.S. agriculture growing faster than domestic food and fiber demand, U.S. farmers and agricultural firms rely heavily on export markets to sustain prices and revenues. U.S. export revenues have accounted for 20-30 percent of U.S. farm income during the last 30 years and are projected to remain at this level.

Nonsubsidized Commodities Now Account for Most of U.S. Agricultural Exports

Historically, bulk commodities—wheat, rice, coarse grains, oilseeds, cotton, and tobacco—accounted for most of U.S. agricultural exports. Because of a cost advantage due to favorable land resources and capital-to-labor ratios, the United States is comparatively better at producing these crops than many other countries. The adoption of biotechnology and consolidation of farm operations have further boosted productivity. Stagnant import demand in some major markets, however, has resulted in a shift in U.S. exports of grains and oilseeds. Over the last decade, the share of U.S. bulk commodity exports shipped to developed countries dropped from 43 to 34 percent. Fast-growing developing countries are the prospective future markets for U.S. bulk crops and other farm exports. China, for example, is now the largest importer of U.S. soybeans, having surpassed the EU.

In the 1990s, U.S. exports of high-value products—meats, poultry, live animals, meals, oils, fruits, vegetables, and beverages—showed steady growth, while exports of bulk commodities tended to fluctuate more widely, particularly in response to changes in global supplies and prices (Chart 8-7). As population and incomes rose worldwide in the 1990s, U.S. exports of high-value products (HVPs) expanded in response to demand for greater diversification of diets. In fiscal 1991, HVP exports exceeded exports of bulk products for the first time (in terms of value). Notwithstanding that producers of HVPs receive little in the way of commodity subsidy payments compared to producers of bulk commodities, HVP exports have continued to exceed bulk exports, regardless of overall growth of U.S. agricultural trade.

Chart 8-7 Value of U.S. Agricultural Exports of Bulk and High-Value Commodities
High value commodities are now a greater share of U.S. agricultural exports.



Note: Bulk commodities are wheat, rice, coarse grains, oilseeds, cotton, and tobacco. High-value products are meats, poultry, live animals, meals, oils, fruits, vegetables, and beverages.
Source: Department of Agriculture (Economic Research Service).

Trade Agreements Promote Reform of U.S. Commodity Support Programs

The November 2001 declaration of the World Trade Organization's (WTO) Fourth Ministerial Conference in Doha, Qatar, provides for negotiation on a range of subjects, including the reform of agricultural and trade policies among all 149 members. This 2001 declaration was further supported by the March 2005 ruling of the WTO Dispute Settlement Body against certain U.S. cotton program subsidies.

The United States has implemented free trade agreements with several countries, and has negotiated and is currently negotiating free trade agreements with various additional countries (see Chapter 7, *The History and Future of International Trade*, for further information); all of these agreements call for increases in market access, both for agriculture and for other goods and services. As an example of the impact of these types of agreements, the North American Free Trade Agreement (NAFTA), implemented in 1994, has spurred market integration among businesses and communities in Canada, Mexico, and the United States, with research showing that NAFTA boosted agricultural trade substantially above levels that would have occurred without the agreement. Trade negotiations provide an opportunity to remove market distortions and increase market access for U.S. exports including agricultural exports.

Benefits of Agricultural Trade Liberalization

At a global level, agricultural land and other resources are used most efficiently when farmers in each country face the same price signals. Prices are the market's way of indicating how much of each crop is produced, how it is produced, and where it should be produced in order to achieve the most efficient production patterns and the best, least-cost outcomes for consumers. Trade barriers, export subsidies, and domestic support programs distort the price signals that farmers receive and limit the potential economic gains that consumers and producers can obtain from trade. Trade liberalization that removes or at least lowers these distortions is motivated by the prospects of economic gains from trade (as in the example in Box 8-1 on New Zealand's experience with trade liberalization).

Empirical evidence suggests that global agricultural policy distortions impose substantial costs on the world economy. One study finds that agricultural tariffs, domestic subsidies, and export subsidies could leave world agricultural prices about 12 percent below levels otherwise expected in an intervention-free market. Because U.S. tariffs, domestic support, and export subsidies are relatively low compared to some other OECD countries, most of the benefits for the United States would come from our trade partners' policy reforms. A new study shows that global reform of agricultural and food trade policy would provide roughly 60 percent of the global gains from merchandise (agricultural and manufactured goods) trade reform—\$180 billion of a total of approximately \$290 billion (in 2001 dollars) by 2015. Even though agriculture is a relatively small portion of world output, agriculture is more protected than other sectors, which accounts for the significant contribution of agricultural trade liberalization to the benefits of total trade liberalization.

U.S. agriculture will continue to be competitive if global agriculture policy distortions are eliminated. According to the same study, with removal of all global agriculture policy distortions U.S. farm exports would increase by 12 percent in volume and the value of U.S. agricultural exports would continue to exceed the value of farm imports to the United States. With global agriculture and food reform, average annual agricultural production growth in the United States would continue to be positive.

Even though the net gains from removal of domestic supports would likely be positive, their removal would likely come with some costs. For example, a portion of domestic support payments are included in the value of farmland and other farm assets, thereby distorting their values. These asset values can decrease in sectors where the subsidies are reduced. However, if the market-distorting subsidies can be replaced by less-distorting payments—in particular, payments that are not closely tied to market prices or quantities, such as lump sum payments—the adverse impacts on farm asset values should be minimized.

Box 8-1: New Zealand's Abolition of Agricultural Subsidies

The farming sector in New Zealand now has negligible subsidies. Historically, assistance to New Zealand farmers was low until the 1970s, when it started to increase dramatically. The support policies of the seventies and early eighties shielded the rural economy from adopting efficient practices, increased transaction costs, and undermined the farm sector's capacity to adjust successfully to international market demands.

Within a broad package of reforms to New Zealand's economy in the 1980s, subsidies to agriculture were abolished in 1985. The reforms had an immediate and widespread effect on agriculture and the rural economy: farm incomes fell, farm input costs (particularly fertilizers) increased, farm profitability declined, the farm debt burden rose, and land values fell. Farmers' problems were compounded by low international prices for some agricultural products during the middle and late 1980s and increasing interest rates. The slower pace of reform for the manufacturing sector and the ensuing appreciation of the real exchange rate made the adjustment process of rural households more acute than the withdrawal of agricultural support would have caused on its own.

Within five years, however, the economy picked up, farm incomes had fully recovered and fears of a rural collapse never materialized. Rural population and farm households proved resourceful in adapting to the changes that swept the sector. Despite the early problems, few farmers were forced to leave their land. The rural economy and the agricultural sector as a whole have become more efficient, and competitive. Farmers have had to become more responsive to world price signals and have shown that they are able to explore and develop new niche markets. A research paper estimated that the annual rate of productivity growth was approximately 50 percent higher during 1985-1998, compared to that of 1972-1984. The level of producer support in New Zealand is now the lowest across member countries of the OECD, domestic and world prices are aligned, and government payments are only provided for pest control or relief against climate disasters. Even with low levels of government support, it is estimated that agriculture accounted for 7 percent of New Zealand's GDP over 2002-2004 compared to 8 percent over 1983-1985, and with a post-liberalization high of 9 percent in 2001. Agriculture accounted for 43 percent of New Zealand's total exports in 2004.

With the removal of global agriculture policy distortions, U.S. consumers would face higher prices for those commodities that currently receive domestic support, such as grains, because their production would fall. U.S. consumers would face lower prices for a few products, such as sugar, that are currently protected by border measures and that will face increased competition from imports.

The recent study estimates that nearly half of the global income gains of approximately \$290 billion would go to developing countries. Global reform thus becomes an effective supplement to, and in some cases a substitute for, less-effective development aid. Several recent studies conclude that global agricultural trade reform would reduce rural poverty in developing economies, both because in the aggregate these countries have a strong comparative advantage in agriculture and because their agricultural sector is important for income generation.

Trade liberalization would be particularly beneficial for the poorest countries, with several studies finding the potential of trade liberalization for manufactured and agricultural goods to lift hundreds of millions of people out of poverty. Debt relief and foreign aid can also help to reduce poverty, but trade is a far more powerful tool. One study finds that the payoff from agricultural trade liberalization to developing countries alone would be \$54 billion (in 2001 dollars) by 2015, roughly equal to the current debt relief proposal of \$56 billion. Furthermore, development aid does not always trickle down to the underprivileged. Agricultural liberalization is particularly important because roughly 75 percent of the world's poor live in rural areas, and because farmers and other low-skilled workers constitute the vast majority of the poor in developing countries. An open global market for agricultural goods would lead to greater crop specialization, increased agricultural exports, and higher farm incomes in poor countries.

Alternatives to Commodity Subsidies

Support to agriculture can come in many forms, not all of which are equally market-distorting. For example, some countries (including the United States) offer fixed payments to farmers, irrespective of what they produce. *Decoupled payments* are lump-sum income transfers to farm operators that do not depend on current or future production, factor use, or commodity prices. From an economic perspective, the best way to provide agricultural support would focus on forms of support that interfere less with market forces while achieving the desired policy objectives.

The WTO's Uruguay Round Agreement on Agriculture encourages countries to "decouple" support from the production of specific commodities by creating a "green box" category for agricultural support. The main criterion for a support program's eligibility to be included in the green box is that the program is "not more than minimally trade-distorting." Unlike the WTO's categories for support that is more trade-distorting, the green box is not subject to spending limits. Note that the term "green box" refers to potential trade-distorting impacts and not to environmental issues, although environmental programs may be included in the green box.

Besides including lump sum payments not tied to present or future prices or output, the green box includes payments for “doing something,” such as conserving the soil. For instance, support can be shifted from payments based on commodity output to agri-environmental programs such as the U.S. Environmental Quality Incentive Program, which has provisions to pay farmers to adopt environmentally benign management practices. Payments can also be made for activities that benefit the entire farm sector. For example, investments in public goods like infrastructure for rural development (e.g., roads), agricultural research, market promotion, extension and teaching, as well as collecting and diffusing agricultural statistics and market information, are also included in the green box. Government support for activities that boost agricultural productivity in the United States relative to that in other countries can help to increase competitiveness of U.S. agriculture in world markets. The exemption of these decoupled payments from WTO payment ceilings provides members of the WTO with the flexibility to transfer income to their agricultural producers, but in a manner presumed to have minimal potential to distort production and trade.

While green box payments are not currently constrained by global trade rules, many countries argue that some of them distort production and trade and that their use should be limited. A recent study of the U.S. experience with decoupled payments finds that these payments have improved the well-being of recipient farm households, enabling them to comfortably increase spending, savings, investments, and leisure but with minimal distortion of U.S. agricultural production and trade.

Environmental Aspects of Agricultural Subsidies

In the 1980s, agri-environmental programs began to play a larger role in Federal farm policies, in part due to greater concern about environmental damage from agricultural production. While U.S. agri-environmental policies have long addressed the negative externalities of agricultural production, agri-environmental policy in a number of developed country members of the WTO is increasingly giving attention to the positive by-products of agriculture. Major US agri-environmental programs can be categorized as either incentive programs or cross-compliance mechanisms (see Box 8-2).

Agri-environmental incentive programs can be further categorized as follows:

- *Land retirement programs* remove land from crop production. In exchange for voluntarily retiring land, producers receive rental or easement payments plus cost sharing and technical assistance to aid in the establishment of permanent cover on the land. Economic use of the land is limited under retirement programs (e.g., the Conservation Reserve Program and the Wetlands Reserve Program). The bulk of U.S. agri-environmental programs expenditures fall in this category.

Box 8-2: Policy Mechanisms for Addressing Agri-environmental Issues

The United States and many other developed countries utilize a combination of programs to address agri-environmental issues:

- *Voluntary incentive-based programs.* Agri-environmental incentives are payments made to the farmer for the adoption of environmentally sound practices or to retire environmentally sensitive land from production. The advantage of incentives is that they increase the likelihood that farmers will adopt the desired practices or retire land. The disadvantage of incentives is the cost to taxpayers. Incentives can also have the effect of expanding production, so even if the disamenities (negative by-products of agricultural production) produced by each farm (or on each field) decrease, more farms (or fields) may now produce disamenities. For example, a business that would be unprofitable when subject to a tax may be made profitable through the payment of an incentive or a subsidy. While a tax may drive a business out of a competitive industry, an incentive may increase entry and induce expansion in competitive outputs. Nonetheless, while economic theory may suggest that taxes are the most economically efficient instrument to reduce pollution, they have seldom been used in agri-environmental programs at the Federal level in the United States. Note too that assessing taxes on the level of agricultural pollution is difficult due to its *nonpoint source* nature (that is, the originating source(s) of agricultural pollution cannot be easily pinpointed).
- *Regulation.* Regulatory requirements or standards represent an involuntary or mandatory approach to improving agri-environmental performance. Unlike policy choices in which farmer participation is uncertain, regulations require that all farmers participate. This feature can be particularly important if the consequences of not changing practices are drastic or irreversible. On the other hand, regulatory requirements are a blunt tool and can be the least flexible of all policy instruments. This regulatory instrument requires that producers reach a specific environmental goal or adopt specific practices without regard for cost or environmental effectiveness, which may vary significantly across farms, but are seldom known by regulators. Consequently, regulation can be less flexible and less efficient than economic incentives. Regulatory requirements are used sparingly in both the United States and the EU.
- *Cross-compliance.* Cross-compliance requires a basic level of environmental compliance as a condition for farmer eligibility for other government programs that farmers may find economically desirable, such as producer payments. Technically, cross-compliance is a voluntary instrument, but in practice it may not strictly be perceived by

Box 8-2 — continued

farmers as voluntary, particularly when the existing subsidy represents an important share of total farm income. Namely, it may be difficult for a farmer to forgo cross-compliance when the value of the existing subsidies exceeds the farmer's costs of adopting the mandated practices. An advantage of cross-compliance programs is that less government spending is required than with subsidies to address environmental problems. Disadvantages are that it will have a lesser impact on farms that are not traditional participants in commodity payment programs or in situations when program payments are lower than the costs to farmers of complying.

- *Working land conservation programs* support adoption and maintenance of land management and structural conservation practices on agricultural land, including crop and grazing land, and in some cases, forestland, in exchange for cost-shares or incentives (e.g., the Conservation Security Program and the Environmental Quality Incentive Program).
- *Agricultural land preservation programs* help retain land in agricultural production by purchasing the landowner's right to convert land to other uses (e.g., the Farm and Ranch Land Protection Program).

A requirement for agri-environment programs to be included in the WTO green box is that they have not more than “minimally” trade-distorting effects. With the exception of the Conservation Reserve Program (CRP) and other land retirement programs that likely reduce U.S. production, current U.S. cost-sharing, incentive payment, and technical assistance programs have a minimal effect on production, given that the focus of such programs is on environmental improvements rather than altering production. In contrast, the focus of complaints brought before the WTO to date on agricultural subsidy programs has been on programs that may have a tendency to increase production, not reduce it.

If new WTO negotiations produce an agreement to further reduce trade-distorting domestic support, countries may find it necessary to shift support from programs that are subject to reduction to programs that are exempt. This may include agri-environmental programs that qualify for inclusion in the WTO green box. Nonetheless, great care needs to be taken in designing programs to ensure that they indeed have only minimal trade-distorting effects (in particular, production-increasing impacts tend to be a source of international contention); there is no reason to assume that environmental programs will automatically fall in the WTO green box.

Conclusion

While the income of farm operator households is higher than the U.S. average, their household income is more variable than that of the average U.S. household because farm income is more variable than income from off-farm sources. Management of the risks faced by large commercial farms—who receive the biggest share of U.S. subsidy payments—may be best served by crop or revenue insurance and forward pricing through participation in futures and options markets. And if one of society’s goals for agricultural subsidies is to support the nonmarket benefits of agriculture, then there are more efficient instruments than those that are coupled to commodity production.

If the intent of commodity support programs is to assist low-income households, then these programs are failing in this task today because the bulk of payments go to farm households with incomes above the U.S. nonfarm average. Furthermore, as world trade in agricultural products increases, food security for U.S. consumers becomes less dependent on domestic production and, consequently, on domestic commodity subsidies programs. Not only are domestic commodity policies—domestic support, market access, and export subsidies—not targeting vulnerable populations in the United States, these policies, as used by the United States and other countries, reduce farm income in poor countries.

Box 8-3: A Market-Based Approach to Reduce Overfishing

The Nation’s marine fisheries are valuable resources, contributing \$31.5 billion in value added to U.S. GDP, supporting 82 million recreational fishing trips, and providing 9.5 billion pounds of protein-rich food. Unfortunately, many of these fisheries suffer from overfishing, excessive harvest capacity, and low profitability. Limited Access Privileges (LAPs)—which give individual commercial or recreational fishermen, cooperatives, or communities the exclusive privilege of harvesting a share of the total allowable catch—are a market-based approach to addressing these challenges.

Under traditional management approaches, fishermen compete for a share of a common resource. This leads to a “race for fish” that results in short fishing seasons, higher harvesting costs, lower profits, overcapacity, poor product quality, and environmentally damaging fishing

Box 8-3 — *continued*

practices. Traditional approaches often mandate certain fishing gear, specify short fishing seasons, and impose other restrictions to limit overfishing. These restrictions are difficult to enforce, do not provide incentives for fishermen to reduce their catch, and impede the development of innovative technology and fishing practices.

LAP programs, which include individual fishing quotas (IFQs) as well as allocations to fishing cooperatives, communities, and potentially, recreational fishermen, do not suffer from these same problems. LAPs with transferable quotas provide fishermen with the incentive to harvest fish at minimal cost, thereby reducing fleet overcapacity and increasing profitability. Each fisherman in a LAP program cannot harvest more fish than his individual quota permits. This means that fishermen can adopt new fishing practices to reduce bycatch (i.e., unwanted or unintentional catch) without concern that they will lose target catch to competitors, and have a lot more choice about when to fish, allowing them to avoid hazardous weather and sea conditions and improve their profitability by fishing when prices are best.

LAPs have been implemented in eight U.S. fisheries since 1990. Commercial fishermen in these fisheries have seen increased profits, decreased harvesting costs, and a safer and more stable industry. For example, due to improved product quality under a LAP program, the Alaska pollock catcher/processor cooperative fleet harvest in 2001 yielded 49 percent more products per pound than in 1998, the last year of the "race for fish." IFQs in the Alaska halibut and sablefish fishery ended the race for fish and increased season length from less than 5 days to 245 days per year. Profits have increased due to lower operating costs and higher product prices, which have more than doubled because halibut now arrive to market fresh rather than frozen, thereby benefiting consumers. Harvesting costs in the mid-Atlantic surf clam and ocean quahog fishery have fallen by 46 percent since implementation of an IFQ system.

In September 2005, the President proposed legislation reauthorizing the Magnuson-Stevens Fishery Conservation and Management Act that would implement key elements of the President's 2004 Ocean Action Plan, including encouragement for fishery managers to use market-based management, such as LAPs. At the same time, the Administration pledged to work with regional fishery management councils to double the number of LAP programs by 2010, bringing at least eight new fisheries under market-based management. The Administration is also working with regional fishery managers to create guidelines for planning and implementation of future LAP programs.

The U.S. Financial Services Sector

Everyday life tends to expose people to the financial services sector. For example, people make deposits at banks and obtain loans from them. Nevertheless, understanding what this sector does can be difficult. Why do individuals go to intermediaries like banks for mortgages, rather than skip intermediaries (and their costs) and deal directly with savers? And why do financial service firms ask for so much information before making a loan and, afterward, place so many restrictions on borrowers?

This chapter explores what financial services do for an economy, how financial development relates to economic performance, and how financial services can be effectively regulated. In particular, it develops the following conclusions.

- The financial services sector addresses informational problems that can otherwise keep financial capital from finding productive uses. Moreover, the U.S. financial services sector tends to deliver these services in a cost-effective manner.
- Financial services facilitate innovation and thus encourage the economic growth that is necessary to increase living standards over time. They might also bolster economic stability.
- Financial regulation should protect consumers and ensure the system's safety and soundness. Moving too far in the public regulation direction, however, can stifle the productivity and innovation that are necessary for the economy to enjoy fully the benefits of financial services. An effective financial regulatory system appropriately balances the costs and benefits of public regulation.

The Economic Roles of Financial Services

Financial services address information problems inherent in lending and investing. This section explains this and other benefits, and presents evidence that the United States enjoys a comparative advantage in producing financial services.

Financial Services Address Information Problems in Lending and Investing

Adverse Selection

In general, information problems can hinder efficient economic behavior. Consider an example from the used-car market. In this market, sellers are

likely to have better information than do buyers about the cars being sold. A buyer might have general information about the quality of a certain model, but the seller likely enjoys additional information about the particular car that is being considered. In this and related cases, information is said to be distributed *asymmetrically* across the transaction's parties.

Economic theorists have shown that, absent a tool for reducing information asymmetries, only the worst-quality cars will be sold. In the case of the used-car market, given the general nature of the buyer's information, he or she may be willing to pay only the average price that the model under consideration tends to command. But sellers may then only offer cars that are below average in quality—i.e., “lemons.” Indeed, a seller would incur a loss by selling an above-average car at a price based on the value of the average car. Consequently, high-quality cars might never make their way to the market.

This tendency for sellers of lemons to *adversely select* themselves creates difficulties in a number of markets, including those for financial capital. For example, just as a used car's owner has relatively good information about that car's quality, a manager likely has better information about his or her business projects than does an outside supplier of financial capital. This information asymmetry, in turn, can encourage “low-quality” projects to adversely select themselves into the financial market. As in the automobile example, relatively well-informed sellers (managers) may want to withhold highly valued assets (the right to share in the proceeds of a new project) if the general nature of available information lets buyers bid only an average price. An economy may thus forgo the very projects that are important for its performance.

Moral Hazard

The above discussion shows that, when information is asymmetric before a transaction takes place, the side with relatively good information can adversely select itself. The prospect of this strategic behavior can discourage the financing of otherwise valuable projects. But even if parties to a potential transaction can address this problem, information can still be asymmetric after a transaction takes place. This latter type of asymmetry is known as *moral hazard* and, left untreated, it too can hinder economic efficiency.

Like adverse selection, moral hazard is problematic for a number of markets. For example, because insurance customers have better information about their behavior than do insurers, an individual who buys insurance can subsequently take on too much risk. Here, an insured driver might enjoy the benefit of driving faster (e.g., the value of time saved) while passing at least some of the costs on to the insurance agency (e.g., the value of an expected claim).

A similar phenomenon plays out in more narrowly defined financial services. Indeed, just as insurance customers tend to have better information about their behavior than do insurance sellers, businesses and households tend to have better information about how they use loans than do lenders.

Lending contracts, like insurance contracts, may thus be plagued by moral hazard problems. A manager might, for example, pursue a project that is more risky than what was agreed upon when the loan was made. In doing so, the manager enjoys the benefit of projects that ultimately perform well, but passes the cost of poorly performing projects onto the firm's lenders. Absent an institution that would discourage managers from acting in this manner, suppliers of financial capital will be reluctant to offer financing. Again, the problem of asymmetric information can lower an economy's level of productive activity.

Financial Services Can Mitigate Adverse Selection and Moral Hazard

The above discussions show that information problems can impede the efficient use of financial capital. Because these problems can stand in the way of better outcomes for *both* demanders (i.e., businesses, households) and suppliers (i.e., savers) of financial capital, opportunities exist for a third party to reduce informational obstacles. Financial service providers frequently play this important intermediary role.

Financial service firms can, for example, build expertise in evaluating and monitoring borrowers. Understanding what is, and what is not, a productive project can check the problem of adverse selection. An effective monitoring program can then keep borrowers on task with agreed-upon projects and thus limit moral hazard problems.

Demanding collateral can help mitigate information problems in this regard. To see how, suppose that a low- and a high-quality applicant ask for a loan and notice that, while information about quality is important for deciding whether to grant a loan, low-quality applicants may not want to divulge that information. In terms of the above discussion, lenders are worried about low-quality individuals *adversely selecting* themselves into the pool of applicants.

Asking for collateral can address this problem by encouraging applicants to truthfully (rather than strategically) reveal this information. Here, high-quality applicants are more willing to post collateral because they are more confident that they will not lose it. In this manner, collateral requirements can induce applicants to truthfully separate themselves into distinctive types of borrowers (rather than strategically masquerade as more attractive types).

Likewise, asking for collateral can mitigate the problem of *moral hazard*. Recall from the above discussion that borrowers may find it attractive to opportunistically increase a project's risk. Collateral requirements can mitigate this problem by essentially exposing the borrower's own capital to such risk taking.

In each case, financial service firms reduce informational obstacles that can stand in the way of lending. A good project can benefit both the project's manager and lenders. But because managers tend to have better information about projects, both before and after the projects are underway, passive lenders

will be reluctant to offer the requisite funding. By specializing in setting collateral requirements and evaluating and monitoring projects, financial service firms can play the important economic role of reducing such asymmetries.

Financial Services Reduce the Cost of Collecting Information

A well-developed financial system not only mitigates information asymmetries, it does so in an efficient manner. Notice from the above example that individual savers could, in principle, mitigate these asymmetries themselves. In doing so, however, they would unnecessarily reproduce the same information a number of times. The relatively high cost of collecting information in this manner would still leave an economy with considerable information asymmetries and thus prevent financial capital from being matched with its most productive uses.

A reputable car dealer illustrates this point. After carefully examining a car, a dealer might offer a guarantee. In that case, prospective buyers can take some confidence from the guarantee itself, as opposed to having to reproduce information about the same car through repeated examinations. In a competitive environment, the associated cost savings can make their way to consumers. By essentially delegating the process of information discovery to experts, savers can likewise benefit from having financial service firms examine prospective investments on their behalf. In both cases, intermediaries not only facilitate mutually beneficial trades by reducing information asymmetries, they produce these benefits in a relatively low-cost manner.

Other Benefits of Financial Services

Diversifying Investment Risks

In addition to being concerned with asymmetric information problems, individuals are concerned with the fundamental risks to which their savings are exposed. Indeed, independent of information problems, the return on investments can be very uncertain. This type of risk can also discourage financial capital from finding productive uses. Financial services can address this problem by economizing on the costs of investing in diversified pools of loans.

By saving at a bank, for example, individuals do not expose themselves to the risk of any one investment. Instead, they can participate in the return from a pool of investments, some of which will perform better at times than do others. On average, then, savers can reduce the volatility that they would otherwise face in an undiversified portfolio while maintaining a relatively high rate of return.

Transforming Long-Term Investments into Liquid Assets

Financial services can economize on the cost of providing liquid access to even long-term investments. Individuals tend to save because they want to

expand their consumption opportunities in the future. But while investments in assets like long-term loans might be good at expanding these opportunities, they are typically not good at facilitating exchanges. It is much easier to buy groceries, for example, with currency than it is with a long-term loan. Absent a mechanism that can readily transform loans into more readily usable forms of money, savers will again be reluctant to invest in projects that could otherwise be mutually beneficial.

Financial firms provide savers with liquidity. Banks, coupled with Federal deposit insurance (discussed in the Policy section below), can fund long-term business projects while fulfilling the transaction demands of depositors. Absent such a service, savers may be reluctant to commit their capital for longer periods of time. But innovative projects frequently need long gestation periods to build themselves into productive endeavors. By giving savers ready access to the proceeds of even long-term investments, financial services again encourage capital to find its best uses.

Providing Cost-Effective Means of Payment

The financial sector also furthers economic well-being by economizing on the costs of producing payment services. The most widely used means of payment, cash, is a good way to make small purchases, but creates difficulties for larger transactions and those made from a distance. Financial services have found innovative ways to make life easier here.

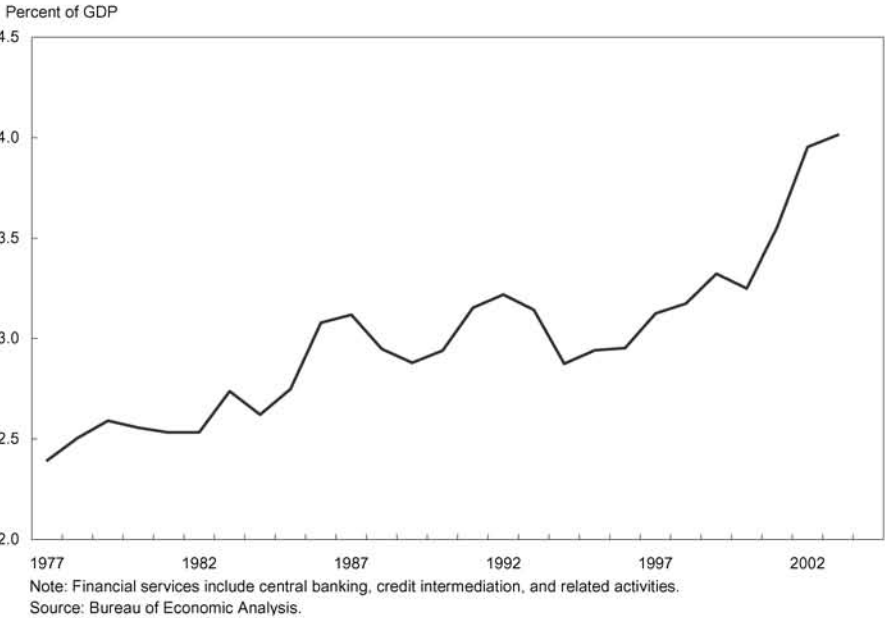
Services like processing checks and conducting electronic funds transfers, to name a couple, can enhance the speed, safety, and convenience of transacting. In addition, means of payment like these can open up opportunities to better match consumers with the producers of goods and services that they demand. Finally, the potential to expand these already considerable benefits is large. By moving even further toward an electronic payment system, for example, the savings in postage costs alone could reach into the billions of dollars.

The United States Enjoys a Comparative Advantage in Financial Services

The U.S. financial services sector has been making increasing contributions to GDP over the past several decades. The growing importance of this sector to the U.S. economy owes, in part, to the U.S. global comparative advantage in the production of financial services.

Chart 9-1 shows how financial services, such as central banking, taking deposits, and making loans, have accounted for a growing share of U.S. nominal GDP. This contribution has increased steadily from about 2 percent in 1977 (the first year for which data are available) to about 4 percent in 2003 (the most recent year for which data are available).

Chart 9-1 Share of GDP from Financial Services
The contribution of finance to GDP has risen about 68% since the late 1970s.



The growing importance of the financial services sector is consistent with U.S. workers having a global comparative advantage in the production of financial services. For example, financial firms open offices in other countries to serve foreigners (i.e., to export their services). Since 1997 (the first year for which these data are consistently available), exports of financial services have outpaced imports, with exports increasing by about \$15 billion and imports increasing by only about \$5 billion. In 2004, financial service exports totaled \$27 billion while imports of financial services were only \$11 billion.

Economic Growth and Stability

The above discussion highlights the potential for financial services to mitigate information asymmetries and economize on transactions costs. Recent research cites these attributes as important channels through which financial services can increase living standards and promote economic stability. This section elaborates on the general economic benefits that financial services can generate in this regard.

Financial Development and Economic Growth

Well-developed financial markets are important for economic growth. Equipped with a comparative advantage in reducing information asymmetries

and transactions costs, financial service firms can productively identify and guide promising entrepreneurs, and thus pave the way for scarce resources to find innovative projects. Innovations, in turn, can help turn a fixed amount of resources into more output, and thus facilitate increases in living standards.

This funneling of resources to productive projects can also encourage the replacement of outdated and inefficient technologies. Absent productive financial services, for example, individuals can pursue innovations only when they have enough resources to get their projects off the ground. “Idea-rich” but “capital-poor” innovators pose little threat to a market’s incumbents, who can become complacent and set the stage for poor performance to entrench itself. By easing the way for newcomers to participate in the economy, financial services can hasten the replacement of bad ideas with growing opportunities. Box 9-1 discusses the role of financial intermediaries in the development and implementation of particularly innovative ideas.

Box 9-1: Venture Capital and Innovation

Venture capitalists raise funds, search for profitable investments, and then guide investments until sufficient proceeds can be returned to the original contributors. Working through this process, venture capitalists can be especially successful in identifying and guiding productive innovations. An influential study finds, for example, that a dollar of venture capital produces about three times more patents than does a dollar of corporate research and development (R&D). In addition, patents that ultimately emerge from venture capitalization tend to be of high quality.

The previous section of this chapter showed that asymmetric information can slow, or even preclude, mutually beneficial transactions from taking place. In this way, information problems can prevent financial capital from flowing to its most-productive enterprise. These problems can become even more difficult when the project that seeks funding is an innovative one. Indeed, the features of innovative projects tend to be intangible, and thus expand opportunities to strategically act on informational advantages. Without a mechanism for dealing with these advantages, an economy may thus forgo projects that would contribute most to its growth.

Venture capital firms are one such mechanism. Their expertise in identifying productive ideas and creating incentive structures that productively guide development therein lets them attract the type of long-term steady funding that is necessary to see innovations through from start to finish. This necessity for commitment creates risks that do not let other intermediaries succeed. Here, for example, even the most innovative borrowers may lack the credit or business track record that

Box 9-1 — *continued*

would make them attractive prospects to conventional lenders. Venture capitalists overcome such obstacles by taking extraordinary measures to examine prospective projects and maintaining a hands-on approach after making an investment. One study indicates that by discovering worthy projects and shepherding them to fruition, venture capitalists are able to annually attract upward of \$100 billion in funding, and channel this capital in a manner that accounts for about 14 percent of U.S. innovative activity.

Consistent with the argument that financial services encourage growth and discourage entrenchment, one study finds that industries that tend to lack their own funding (and thus rely heavily on external sources to finance projects) grow significantly faster when they are located in countries that have well-developed financial intermediaries (such as banks). In addition, studies show that countries that maintain well-developed financial systems tend to grow their economies at relatively high rates.

This relationship between financial development and economic performance also shows up in data from U.S. states. The relaxation of multi-state branch banking restrictions since the mid-1970s, for example, appears to have improved the quality of U.S. bank lending (as measured by a decline in nonperforming loans). Evidence suggests that the entrepreneurial sector responded to this enhanced development by leading state-level economies onto higher and more stable growth paths. Looking at data at the firm- and economy-levels, as well as across countries and U.S. states, researchers have thus found evidence to suggest that an economy's living standards and growth prospects depend to a considerable degree on its financial development.

Financial Services and Economic Stability

The above discussion suggests that economic growth increases with the development of financial markets and services. Fortunately, such long-term benefits need not compromise short-term stability. Indeed, financial development may contribute to a reduction in the volatility of economic activity.

The reduction in economic volatility over the past several decades is well documented. As indicated in Chart 9-2, the volatilities of real output and consumption growth (measured by their standard deviations over 20-quarter periods) have both trended down since 1950. This remarkable decline in aggregate volatility, coined “The Great Moderation,” appears to have set the

stage for a stable macroeconomic landscape that better avoids the inefficiencies that might emerge from increased economic uncertainty.

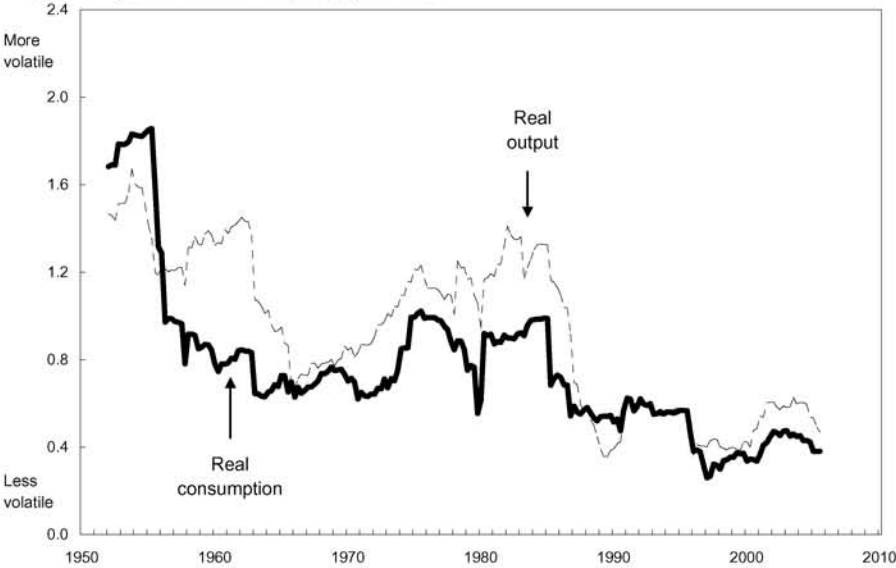
The evolution of the financial system may have played an important, though not exclusive, role in the Great Moderation. One change in the financial system that may have contributed to the Great Moderation was the removal of regulations that created volatility. Evidence suggests, for example, that Regulation Q, which limited the maximum interest that banks could pay on deposits until its repeal in 1980, depressed lending in high-interest-rate environments. As a result, banks may have created volatility by translating financial shocks into real ones.

The Great Moderation may also reflect the financial system's development of more sophisticated ways of managing and sharing risk. For example, banks now use *derivative securities* to insulate their balance sheets from interest-rate risk. Derivatives are contractual arrangements that specify payments between parties, where the payments are usually tied to some observable and verifiable measure (e.g., an interest rate or stock market index). Banks may also use derivatives to essentially purchase insurance against the defaults of large loans. In addition, banks have developed new methods for selling loans to investors through *securitizations*, the process of pooling loans and selling claims on these pools to dispersed investors.

Chart 9-2 Long-Term Decline in Volatility of Macroeconomic Indicators

The volatility of macroeconomic variables has declined over the past several decades.

20-quarter rolling standard deviation of quarterly growth rates



Source: Bureau of Economic Analysis.

Further, innovations in consumer financial products offered by banks, such as cash-out-mortgage refinancing (COMR), may have helped to moderate economic fluctuations. This role was evident in 2001, the year of the most recent recession, when households reportedly extracted \$83 billion of home equity, up from \$26 billion in the prior year. In addition, the widespread distribution of consumer credit has almost certainly allowed many individuals to insulate themselves from short-term economic shocks.

Policy Issues

The financial services sector appears to favorably affect economic growth and may also reduce economic volatility. As the above discussions about financial mechanisms such as collateral and monitoring illustrate, private financiers do a lot to facilitate financial development. However, public policy plays a productive role. In particular, the desire to protect consumers and ensure the safety and soundness of the financial system has motivated policies in this area.

Consumer Protection

Policies protect consumers in a number of settings. The Food and Drug Administration (FDA), for example, requires producers to disclose certain nutritional content and other information about their products. In the financial services sector, the Truth-in-Lending Act also requires informational disclosures. The Act requires that consumers be made aware of information about the amount and rate of interest that they are paying on a loan.

A consumer-protection issue of current interest is identity theft. To conduct their operations and reduce the risks of lending, financial service firms rely heavily on the Nation's credit-reporting system to both assess risk and verify the identity of credit applicants. Identity thieves prey on this system by using another consumer's personal information to obtain credit in the consumer's name.

Identity theft is a considerable problem. In 2005, banks, credit card companies, retailers, and data brokers were involved in high-profile security breaches that affected up to 50 million account holders. The entity whose security is breached generally bears the costs of direct losses from identity theft. However, consumers bear significant indirect costs of verifying fraudulent charges and correcting the damage to their credit profiles.

The Administration has taken substantial steps to protect individuals from identity theft. In 2003, the President signed the Fair and Accurate Credit Transactions Act, which allows all Americans free access to review credit reports annually to ensure the security and accuracy of their credit reports and to protect against identity theft. In 2004, the President signed the Identity

Penalty Enhancement Act, which defined a new crime of “aggravated identity theft” and increased penalties for identity fraud. Congress may enact additional protective measures, and the Administration has recommended that it consider extending to brokers and other entities the consumer safeguards that govern the way financial institutions secure their databases. The Administration also supports narrowly tailored legislation requiring companies to notify consumers if the security of their information has been breached in a manner that creates a significant risk of identity theft. Enacting this legislation would result in uniform national rules for dealing with identity theft, rather than the current patchwork of inconsistent state and local regulations. Of course, some regulations can be overly burdensome if not carefully crafted (see Box 9-2 for additional discussion).

Box 9-2: Regulation Is Not Costless

While regulation can improve economic performance, it can also have the opposite effect if not carefully crafted. For instance, if consumer-protection laws for some transactions are unduly burdensome, financial service firms may stop engaging in those transactions altogether. Therefore, regulations must carefully assess the overall benefit to consumers to be sure the regulation’s benefits outweigh its costs.

Excessive regulation can increase the cost of producing financial services. The now-repealed Glass-Steagall Act is illustrative. The Act prohibited banks from producing commercial and investment services under the same roof. This prohibition addressed the concern that a bank’s investment arm (where banks sell financial securities, like stocks) could opportunistically sell low-quality investments, and then use the proceeds to shore up bad loans from its commercial arm (where banks take in deposits and turn out loans). However, by decreasing the scope of activities in which banks could engage, research has argued that it pushed out economical ways of producing financial services. The costs of regulation, in this case, could very well have outweighed the benefits.

Finally, regulation can work against the ability of financial services to encourage capital to find productive uses. As described in the previous section, research has found that historical restrictions on banks opening new branches in other states decreased the quality of loans. When banks make bad loans, financial capital may not find its most productive use. Consistent with this argument, state-level economies grew at faster and more stable rates after they relaxed bank branch restrictions.

Safety and Soundness

Another policy concern, the financial system's safety and soundness, has deep historical roots. Until the 1930s, the banking sector was largely unregulated. As such, it was susceptible to *bank runs*, whereby depositors raced to withdraw funds in anticipation that others would do so first. Bank runs are problematic because banks cannot quickly turn loans into cash in order to repay depositors. Indeed, faced with a deposit run, a bank may be forced to sell loans at a discount, which could leave depositors toward the end of the run with little or no money.

To address this problem, the Federal government began to insure deposits. Depositors have little reason to run on a bank when their funds are guaranteed by the government. However, given that this insurance can expose the U.S. taxpayer to potentially large losses, the Federal government has an obligation to ensure that banks operate in a safe and sound manner.

Federal banking agencies have sought to achieve safety and soundness through *supervision* and the setting of *capital requirements*. Agencies supervise banks much like banks would monitor their loan customers. Bank capital requirements dictate the amount of capital or liquid assets that banks must hold as a cushion against potential losses.

The Basel Accords

Capital requirements have found guidance over the past two decades from two international agreements known as the Basel Accords. These agreements were created under the auspices of the Basel Committee on Banking Supervision (which is organized and operated by the G-10 countries) within the larger Bank for International Settlements (BIS) located in Basel, Switzerland. The Basel Accords aim to produce general principles and guidelines rather than promulgate binding law.

Basel I was instituted in 1988, and Basel II was issued in June 2004 (but has not yet been implemented). Basel II was designed to improve upon its predecessor, Basel I, in the areas of risk management and capital adequacy. And while the Accords are intended for large international banks, a number of countries are using them to guide domestic banking industries.

In addition to protecting depositors, Basel I and II aim to mitigate global *systemic risk*: the risk that an event will trigger significant adverse effects on the economy through loss of economic value and confidence in the global financial system. Systemic risk is normally associated with spillover effects, in which the original shock spreads contagiously to other parts of the global financial system and disrupts output and employment. The adverse effects of systemic problems can arise from disruption of credit and capital flows. The failure of a major international bank due to inadequate capital financing provides one example of the type of “event” that could trigger adverse shocks.

Prior to Basel I, countries operated under very different regulatory capital regimes for their banks. Over time this arrangement raised competitiveness and financial soundness concerns, prompting banking supervisors in the industrialized countries to establish common approaches to defining regulatory capital and setting minimum regulatory capital requirements. Still, under Basel I, minimum capital requirements can lack sensitivity to the underlying riskiness of a bank's business activities. This encourages bank investments in higher-risk assets for which regulatory capital charges are too low, and fails to reward improvements in the bank's underwriting and risk-management processes. The lack of risk sensitivity also reduces the effectiveness of statutorily mandated, prompt corrective-action policies in the United States, which are tied to a bank's regulatory capital ratios. In recent years, financial innovations, such as securitization and credit derivatives, and the greater sophistication and complexity of risk-management techniques have rendered the current regulatory capital framework, and related bank-reporting and disclosure policies, increasingly outmoded for large, internationally active banking organizations.

On September 30, 2005, the four Federal banking regulators (the Board of Governors of the Federal Reserve System, the Office of the Comptroller of the Currency, the Federal Deposit Insurance Corporation, and the Office of Thrift Supervision) announced their intent to issue in 2006 a Notice of Proposed Rulemaking for the U.S. implementation of Basel II. The banking regulators plan to implement only the so-called "advanced" Basel II approaches, under which minimum capital requirements would be much more closely aligned with a bank's actual risk taking by linking these requirements to the bank's own internal risk assessments. This new framework introduces three "pillars" intended to make reported regulatory capital ratios better indicators of a bank's financial condition and to make a bank's risk taking more transparent to both supervisors and the general public. Pillar 1 sets a bank's minimum capital requirement based on capital formulas whose basic inputs are derived from the bank's internal risk-management systems. Pillar 2 establishes a process through which supervisors and senior bank management will review a bank's overall capital adequacy in relation to its business activities and plans. Last, Pillar 3 attempts to enhance transparency through requiring expanded public disclosures of a bank's risk positions. Under the plan announced by the banking agencies, qualified U.S. banks could begin transitioning to the advanced Basel II approaches in January 2009.

Within the United States, only a few banks are expected to apply this new framework. It will be mandatory only for the largest, internationally active U.S. banks under the belief that the advanced risk-measurement and management standards are most appropriate and cost-effective for these institutions. However, any U.S. bank may elect to adopt the new framework voluntarily.

To address potential competitiveness concerns that might arise from banks being subject to different capital standards, the Federal banking agencies also are considering possible modifications of the U.S. capital rules that would apply to those banks not adopting the advanced Basel II approaches. Broadly, such modifications would be designed to make the rules applicable to the vast majority of banks more risk sensitive, but without sacrificing overall simplicity of the current capital framework.

As discussed above, capital standards for large banks are motivated by the need to protect depositors and limit systemic risk. Concerns about systemic risk extend beyond the traditional banking sector to other sectors, such as government sponsored enterprises (GSEs).

Government Sponsored Enterprises (GSEs)

The Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation, more popularly known as Fannie Mae and Freddie Mac, are two *government sponsored enterprises* (GSEs) that are organized by the Federal government for the purpose of supporting the secondary market for residential mortgages. The original congressional intent behind the formation of these institutions was to provide stability and liquidity in the mortgage market and to promote home ownership, particularly among low-income families, by reducing the costs of mortgages. (The government also pursues these objectives through the Federal Home Loan Bank (FHLB) system.)

Fannie and Freddie primarily run two businesses: mortgage securitization and portfolio management. In their securitization program, Fannie and Freddie buy home mortgages from banks and other mortgage loan originators, package them into pools, and sell claims on these pools to investors as *mortgage-backed securities* (MBS). To augment investor demand, Fannie and Freddie guarantee the interest and principal on the underlying mortgages. These securitization programs provide liquidity to mortgage markets by expanding the range of investors who hold mortgage assets. The portfolio-management function of Fannie and Freddie arises because they purchase and hold MBS on their balance sheets. The combined assets on the balance sheets of Freddie and Fannie rose from \$132 billion (5.6 percent of the single-family home-mortgage market) at the end of 1990 to \$1.38 trillion (23 percent of the home-mortgage market) by 2003.

The market perception that the U.S. government backs GSE-issued debt has facilitated the growth in Fannie and Freddie's portfolios. Although GSE debt is not guaranteed by the government, the balance of evidence suggests that most investors perceive that the Federal government would step in to prevent a GSE default. This perception allows GSEs to issue debt at an estimated 40 basis points (i.e., 0.40 percent) below the rates of their peer institutions. With access to relatively inexpensive funds, the GSEs can easily finance expansions of their portfolios.

The growth in GSE portfolios is accompanied by prepayment risk. Prepayment of mortgages is problematic because GSEs tend to raise funds at fixed interest rates, and prepayments tend to occur when interest rates fall. Raising funds at fixed interest rates implies that GSE debt issued to finance a purchase of mortgages is fixed until the debt matures. However, if interest rates fall and, as a result, prepayments occur, the GSEs must reinvest the funds from the prepayment in the now-lower interest-rate environment. Typical methods for hedging prepayment risk (without assuming additional credit risk) include the use of interest-rate swaps to turn fixed-rate debt obligations into floating-rate ones, and the buying of Treasury securities. Both methods generate income when interest rates fall, helping to offset the decline in income caused by prepayments.

While all mortgage investors may face prepayment risk, the size of the GSEs makes this risk of particular concern to financial markets and regulators. Given the large size of their portfolios, it might be very difficult for the GSEs to quickly adjust their portfolios if hedges turned out to be less than perfect. The sudden failure of one of these enormous providers of mortgage liquidity could severely diminish the liquidity of the mortgage market and create severe financial stress for holders of GSE securities. Prepayment risk is also compounded by the low level of GSE capital. The capital-to-asset ratios (measures of the financial cushion available to absorb portfolio losses without becoming insolvent) of Fannie and Freddie are roughly half the average capital-to-asset ratios at comparable financial institutions.

The Administration's policy proposals have attempted to minimize the systemic risks posed by GSEs, while preserving the benefits for low-income home owners and the liquidity that GSEs provide to mortgage markets. In particular, the Administration has proposed that the GSEs focus on the business of mortgage securitization. As a result, market liquidity will be enhanced for a wider range of mortgages, and the home owner and liquidity benefits associated with the GSEs will be maintained. Moreover, the resulting reduction in the sizes of the portfolios will make the portfolios easier to hedge, decreasing the likelihood of systemic problems with little adverse impact on the liquidity of the market. Indeed, at the behest of the Office of Federal Housing Enterprise Oversight (OFHEO), Fannie's portfolio has declined by \$75 billion in the first half of 2005 without any noticeable effects on the MBS and home mortgage markets. Apparently, there was ample MBS demand from other investors, including banks and insurance companies.

The Administration has also recommended that regulators be allowed a free hand in setting minimum and critical capital levels for the GSEs, and that a clear and credible receivership process be established for the GSEs. This extension of regulatory authority should have little impact on the liquidity-generating activities of the GSEs (i.e., their securitization activities), but would help to mitigate the likelihood of systemic events.

Conclusion

Information tends to distribute itself asymmetrically—e.g., borrowers tend to have better information about how they will use funds than do lenders. The potential to exploit such advantages can stand in the way of mutually beneficial transactions. Financial services are important for economic performance because they can check this potential in an efficient manner. While they do not make tangible goods, these organizations can play an integral role in expanding economic possibilities.

Public policy can improve upon unregulated outcomes, but must do so in a cost-effective manner. Moving too far on deregulation could compromise consumer protection and system soundness. But moving too far on public regulation can weaken economic performance. A well-developed financial system is thus one that balances the costs and benefits of public regulation. Systems like that in the United States appear to have found this balance, and thus tend to support strong economies.

The Role of Intellectual Property in the Economy

Certainly an inventor ought to be allowed a right to the benefit of his invention for some certain time. It is equally certain it ought not to be perpetual; for to embarrass society with monopolies for every utensil existing, and in all the details of life, would be more injurious to them than had the supposed inventors never existed... How long the term should be is the difficult question.

—Thomas Jefferson, 1807

The founders of this country believed that *intellectual property* was so important that one of the specific grants of power to Congress under Article I, Section 8 of the Constitution was the power “To promote the Progress of Science and the useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.” This grant gives Congress the power to define and to protect intellectual property through measures such as the issuance of patents and copyrights.

Other powers granted to Congress by Article I, Section 8 of the Constitution include taxation, regulating interstate commerce, coining money, borrowing, and naturalization. (For more on the early history of intellectual property rights in the U.S. see Box 10-1.)

Economic research over the past two centuries confirms the Founders’ wisdom regarding the importance of intellectual property. This chapter examines how intellectual property differs from other, more tangible, forms of property, the justification for having a formal system for its protection, and its role in economic growth. The chapter also looks at certain policy challenges in ensuring that intellectual property protection continues to promote U.S. economic growth and development. The key points of this chapter are:

- Intellectual property rights create incentives for individuals and firms to invest in research and development, and to commercialize inventions and other creations by allowing individuals and firms to profit from their creative activities.
- Well-defined and enforced intellectual property rights are an important element of the American economy and can contribute to the economic growth of all countries.

- The Administration continues to vigorously enforce the laws that protect the rights of American intellectual property owners.

Knowledge Is Different from Other Types of Goods

Economists generally recognize that intellectual property (such as knowing how to make bread) differs from physical property (such as a loaf of bread) in two basic attributes:

1. Can more than one person use the good at a time? Physical property, like a slice of bread, can be effectively used for only one purpose at a time, and that use precludes other uses. For instance, a slice of bread used to make a ham sandwich for one person cannot be used to make a grilled cheese sandwich or a ham sandwich for another person. This makes bread a good that is *rival in consumption*, which means that one use or one person's use of the product partially or wholly prevents another use or another person from using it.
2. Can other people be effectively prevented from using the good? The owner of physical property, such as a slice of bread, can prevent others from using that slice with relative ease. This makes physical goods like bread *excludable*, which means that others can readily be prevented from using the good.

Something that could be intellectual property, such as bread-making knowledge, differs from physical property in both of these attributes. Unlike a slice of bread, any person can use bread-making knowledge without diminishing the practical usefulness of that knowledge to anyone else. This makes bread-making knowledge, like all knowledge, a good that is *nonrival in consumption*.

In addition, it is very difficult to exclude others from using knowledge such as the knowledge of bread-making once it is created and publicized. If someone wanted to reap the economic rewards for his creation of such knowledge, his only option may be to not disclose the information at all. Even this approach may not be sufficient if others take active measures, such as *reverse engineering*, to learn how the knowledge was used to produce a product. Once others learn such knowledge, the person who developed it will be unable to prevent others from using it. Under the rules that apply to physical property, this makes knowledge a *nonexcludable* good.

Most knowledge also differs from physical goods in that the costs of developing knowledge are upfront, fixed costs that do not vary with the number of times the knowledge is used. Once it is produced, knowledge can be replicated repeatedly at effectively no cost. For a firm to have an incentive

to create new forms of knowledge, such as a formula for a new drug or a software program, it must be able to recoup its initial costs of development. It may not be able to do this if the knowledge becomes publicly available and competition forces prices down to the level at which they reimburse the seller only for the material costs of the products produced using this knowledge.

Treating Knowledge as Intellectual Property

Because knowledge is nonrival in consumption and nonexcludable, any person who incurs the fixed cost of developing a new or better product or process will soon find that others, including competitors, are using that knowledge. Competition could drive the price of the product down to the cost of the physical inputs used to make one unit of the product. The innovator would receive little or no financial return for paying the cost and undertaking the risk involved in developing such knowledge. Without the potential to profit from such innovation, most individuals will be unwilling to incur the fixed costs and financial risks associated with creating new knowledge.

This is not to say that there is no innovation without the potential for profit. Some innovations might occur as a by-product of the normal production process. Other innovators might still invest in research and development but try to prevent the use of their discoveries by keeping them secret. For many types of innovations this is likely to be costly and ineffective. However, if innovators cannot control the knowledge they have developed, they are significantly less likely to invest in developing such new knowledge.

An intellectual property system creates an incentive to develop certain types of knowledge by granting exclusive rights, enforceable through government action and a well-functioning legal system, to use that knowledge. These exclusive rights enable individuals to profit from their inventions by excluding others from using the innovation. Most intellectual property systems offer innovators an exchange. The innovator is given the right to exclude others—for a limited time—from the use of the innovation, but must provide the public with the complete details of the innovation. This public disclosure furthers the development of the knowledge base by enabling others to build on the knowledge embodied in the intellectual property and avoids the duplication of research efforts.

The Social Costs of an Intellectual Property System

Social costs could arise from making intellectual property protection too strong. These costs go beyond the obvious bureaucratic costs of intellectual property systems. Economics tends to focus on two of these social costs: the potential for creating monopoly power and the restrictions on exploiting useful technologies.

Box 10-1: Intellectual Property in the Early American Republic

While the phrase “intellectual property” is the product of more modern times, the concept in American thought harkens back to the Constitution. The gradual recognition of intellectual property rights in early America predates the Constitutional Convention, where it was formalized in the Constitution. By 1787, every state but one had passed copyright laws and many had already begun granting patents to inventors. Two delegates to the Constitutional Convention of 1787, James Madison and Charles Pinckney, were ardent advocates of assigning copyrights and patents to promote and protect the rights of the authors and innovators. The Framers of the Constitution assented to giving Congress its mandate in Article I, Section 8 to “promote the Progress of Science and useful Arts.”

This is not surprising. The founders, among them Jefferson and Franklin, were deeply influenced by the British common law system and the preeminence of scientific achievements throughout the Age of Enlightenment. Copyright and patent rights in early America, while distinguishable from their English predecessors, were justified on the same basic premise that defense of property rights precipitated economic growth. George Washington noted in his first inaugural address that the ownership of intellectual property is a necessary means of encouraging “exertions of skill and genius” to foster technological development.

Article I, Section 8 (Clause 8) provided the necessary authorization for Congress to extend intellectual property rights in the form of the patent statutes of 1790, 1793, 1800, 1836, and 1839 that were in effect until the Civil War period. Manufacturing productivity at the firm level in early nineteenth-century America has been documented to have varied directly with the level of patent protections afforded to inventors. Spurred by their belief in individual enterprise and the maximization of social returns through private protections, the early policymakers of the American Republic were prescient in their recognition of the importance of intellectual property rights in a market economy.

As Thomas Jefferson noted in the passage quoted at the start of this chapter, the power to exclude, depending on its length, has the potential to create monopoly power. Modern economic analysis supports this conclusion. The holder of intellectual property has a monopoly over the use of that intellectual property, but this control may not result in monopoly power in any meaningful sense. The potential for monopoly power is related to the breadth

and length of the power to exclude others from making use of the intellectual property. If this power is narrow or for a short duration, others can enter the market and compete in a timely manner, and the innovator will have little or no market power. Overly long or broad grants of exclusivity potentially limit the ability of others to compete and create a greater possibility of market power.

Economic research over the past two decades suggests that another social cost of an intellectual property system is that the power to exclude may deter others from advancing the state of knowledge by building on protected intellectual property since permission to use the property may be too expensive or may not be granted. Finally, the expiration of intellectual property protection after a specific time period may also spur firms to continue to innovate to ensure continued market success.

Intellectual Property Rights Basics

Intellectual property protection allows individuals to profit from their innovative or creative activities thereby creating an incentive to innovate and promote technological progress. Balanced against this benefit are the potential costs of giving the innovator monopoly power and limiting the ability of subsequent innovators to build on that invention. In crafting the existing intellectual property laws, Congress and the states have considered these associated costs and benefits and have granted differing levels of protection for four basic types of intellectual property: patents, copyrights, trademarks, and trade secrets. In recognition of the potential social costs of intellectual property protection for some kinds of knowledge, Congress has refused to allow individuals to claim intellectual property protection for certain types of knowledge.

The boundary between what can and cannot be protected is sometimes difficult to define. However, it is generally understood that intellectual property rights cannot protect things like intellectual concepts, mental processes, and basic laws of nature. While many justifications have been offered for these exclusions, one possible explanation, consistent with an economic understanding of the social costs of intellectual property, is that allowing ownership of any of these types of knowledge will create broad restrictions on innovators and will slow technical progress. To prevent stifling of innovation, intellectual property rights are granted only after fulfilling specific legislatively defined criteria and protect only a *particular* implementation, expression, or representation of an idea.

Patents: Protecting a Particular Implementation of an Idea

Thomas Jefferson wrote the original statute defining what may be patented. The language was brief and has changed little since the passage of the original patent act. “[A]ny new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof” may be patented. Patents protect what is normally called an invention but not the idea the machine or process is implementing.

The Constitution grants Congress the power to establish the requirements an inventor must satisfy before a patent is granted. Under current law, Congress requires that an inventor submit plans describing the invention to the United States Patent and Trademark Office (USPTO). To be granted a patent, the invention or innovation must satisfy a patent examiner under a “preponderance of the evidence standard” that the invention is useful, novel, and nonobvious. Once a patent is granted, its holder can exclude others from making, selling, or using the patented invention or substantially similar inventions for up to a Congressionally mandated 20 years after the patent application was initially filed. (A subset of patents called “design patents,” which protect an ornamental design of a product, provide patent protection for only 14 years.) The scope of this right to exclude depends on the legitimate breadth of the patent’s claims. In general, the more novel and innovative a patented product is, the broader are its claims and its protection.

Copyrights: Protecting the Expression of an Idea

Copyrights protect a particular expression of an idea and are generally associated with a variety of creative works including books, music, movies, magazines, paintings, sculptures, and any other expressive work. The key factor for obtaining a copyright is originality, and only a minimal amount of that is necessary. Registering a work with the Copyright Office in the Library of Congress provides some important litigation benefits—including the ability to obtain monetary damages when suing for infringement—but such registration is not necessary. A copyright exists the moment an expressive work is created and, except for work for hire, becomes the property of the author creating the work.

A copyright entitles the holder to exclude others from performing, publishing, or otherwise copying the work. It also entitles the holder to exclude others from producing “derivative works,” such as a movie adaptation of a book or its translation into a foreign language. Copyright protection generally lasts the life of the author plus 70 years. In the case of work for hire or anonymous works, copyright lasts 95 years from publication or 120 years from creation, whichever is shorter.

Trademarks: Protecting the Symbol of an Idea, Product, or Service

Trademarks can be words, phrases, designs, colors, sounds, or any combination of these that are used to distinguish the products or services of one entity from those of another. Trademarks reduce consumer search costs because they make it easier for consumers to identify and find products and services. Trademarks also protect consumers by providing an assurance of quality or attributes that can be expected with the trademarked product. Because the key function of a trademark is to uniquely identify a company, a product, or a service, the qualifying factor for a trademark is distinctiveness. Generic terms for a product and, in some cases, even descriptive terms cannot be a trademark.

Trademarks do not have to be registered with the USPTO but such registration provides the benefit of a legal presumption of nationwide ownership and exclusive right to use the mark for the goods or services identified in the registration. However, a trademark only becomes intellectual property when it is used in commerce to identify a product, service, or company. Trademarks give the holder the ability to exclude others from using that mark to identify any similar product and, in some cases, exclude others from using their mark if that use dilutes or weakens consumer association of the product or service with that mark. Validity of the trademark lasts as long as the trademark continues to identify the product or the company, which in some cases may be for centuries. The oldest U.S. registered trademark still in use today is for Samson Rope and was registered in 1884. However, trademark protection may be lost if the mark becomes associated with a product generically rather than a particular brand as occurred with the term “escalator,” which was once a trademark for escalators sold by the Otis Elevator company.

Trade Secrets: Limited Protection for Knowledge Kept Secret

Trade secrets consist of any information possessed by a firm that the firm takes reasonable measures to keep secret, is legitimately kept secret, and has commercial value because it is secret. This information may include information that could be protected as other forms of intellectual property but also includes knowledge that cannot be so protected, including customer lists, contracts, and other information whose value is diminished if it becomes publicly available.

Trade secrets are not formally protected in the way other intellectual property is protected. Protection is provided under state, rather than Federal, law. For example, protection occurs through the enforcement of the firm’s confidentiality provisions in contracts and the use of the legal system to block those who

have improperly or illegally obtained a firm's trade secrets from using or disclosing them. In general, however, a firm has no legal recourse to prevent others from using its trade secrets if they become publicly available. Trade-secret protection lasts only as long as the firm can maintain secrecy. One of the most successful trade secrets in this regard is the formula for Coca-Cola.

Intellectual Property, the American Economy, and Economic Growth

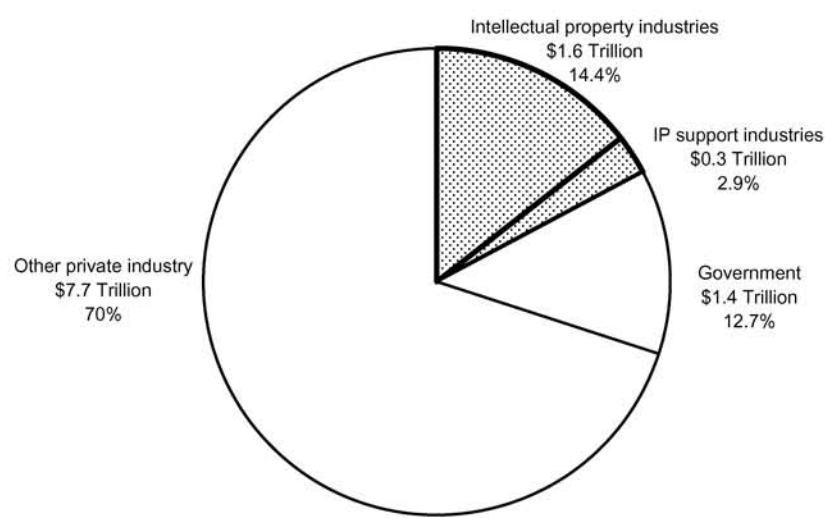
Intellectual property played an important role in the growth of the American economy from a primarily agrarian society through an industrial economy to the current information age. One researcher notes that even in the early part of the nineteenth century, the American patent system granted effective intellectual property rights that led to the development and diffusion of new technologies that fueled economic growth and prosperity. Today intellectual property protection plays an important role in many industries in which the United States has a comparative advantage and contributes to the size, growth, and exports of the American economy.

Intellectual Property and the American Economy

Industries such as chemicals, pharmaceuticals, information technology, and transportation are highly dependent on patent protection to provide the incentives to innovate. Some industries, such as software, entertainment, publishing, broadcasting, and other broadly defined communication industries, are highly dependent on copyright protection to ensure that the creators of such content are fully compensated for their efforts and continue to have the incentive to create such works. The combination of these patent and copyright-dependent industries and any such support industries that are necessary for these industries to function can be grouped together as intellectual property industries. Chart 10-1 shows the total economic activity generated by this group of industries. In 2003, these industries represented approximately 17.3 percent of total U.S. economic activity and approximately one-fifth of private economic activity. Their combined activity exceeds the total economic activity of all levels of government in the United States.

The estimate in Chart 10-1 represents the income generated in intellectual property industries. Equally important is the stock of intellectual property assets that generates these returns. Intellectual property is one of many intangible assets a firm may hold. Other intangible assets include brand value, organizational efficiencies, and firm-specific human capital. It has been estimated that approximately 70 percent of the value of publicly traded companies comes from intangible assets.

Chart 10-1 Intellectual Property Industries' Share of 2003 Gross Domestic Product
In 2003, intellectual property and IP support industries represented 17.3% of total value added.



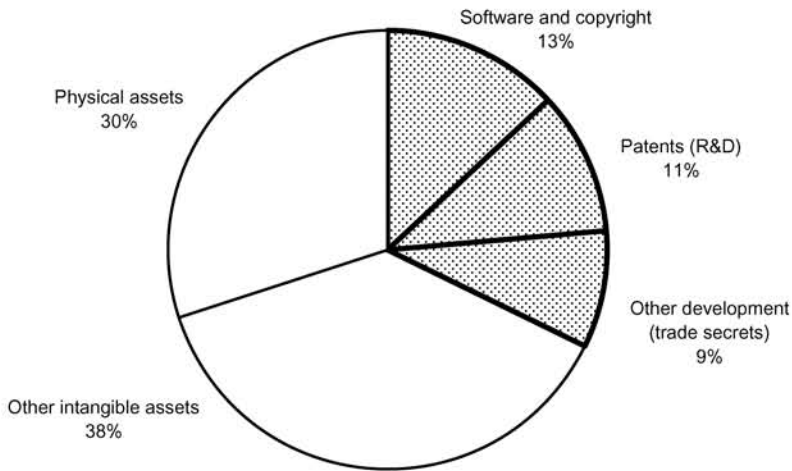
Note: 2003 GDP equals \$11 trillion.
Source: "Engines of Growth: Economic Contributions of the U.S. Intellectual Property Industries" (2005) by Stephen E. Siwek.

Chart 10-2 shows the total asset value of U.S. publicly traded firms broken out by the value of tangible assets, the value that can be inferred for various types of intellectual property, and the value of other intangible assets. Intellectual property accounts for approximately 33 percent of the value of U.S. corporations—with software and other copyright-protected materials representing nearly two-fifths of this value, patents representing one-third, and trade secrets representing the rest. In all, U.S. intellectual property may be worth more than \$5 trillion.

The one type of intellectual property excluded from the estimate in Chart 10-2 is trademarks. While there is no doubt that trademarks represent an important element of any firm's assets, it is difficult to separate the value of a trademark from the value of the rest of the value of branding. However, the sources used to create Chart 10-2 also suggest that the combined value of branding and trademarks represents approximately 14 percent of the total value of publicly traded U.S. firms. In some instances, this value may be a company's most important asset.

Other studies have indicated that intellectual property-related industries tend to grow at approximately twice the rate of the economy as a whole and are an important contributing factor not only to the productivity growth of the intellectual property-related sectors of the economy but also to the growth of all sectors of the economy. These industries also represent a growing share

Chart 10-2 Share of Assets in Current Market Value of Public U.S. Corporations
Intellectual property assets represent approximately one-third of the value of American corporations.



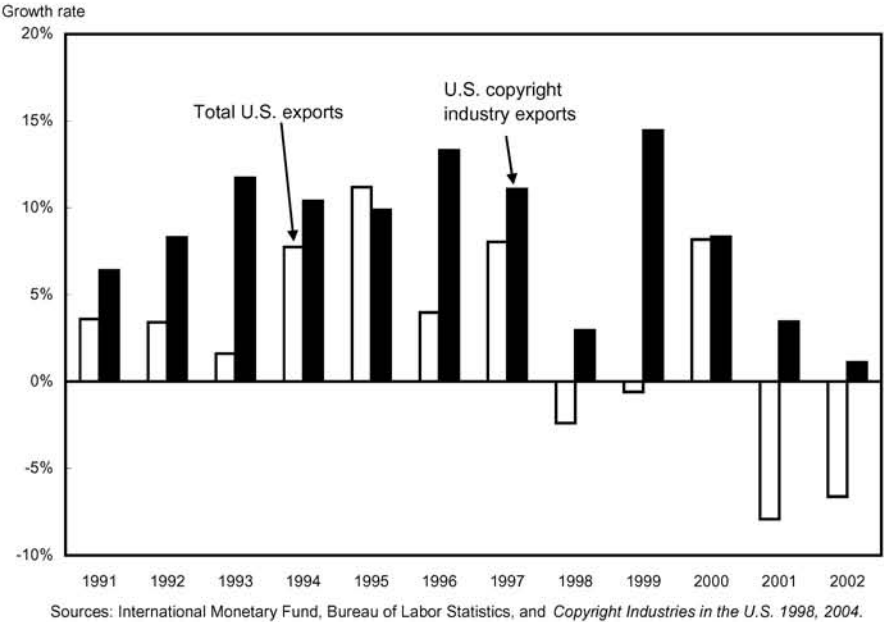
Note: Total value of publicly traded U.S. corporations on 09/06/2005 was \$15.2 trillion.
Sources: Council of Economic Advisers' calculation based on "The Economic Value of Intellectual Property " by Shapiro and Hassett (USA for Innovation) and "Measuring Capital and Technology: An Expanded Framework," Table 3 by Corrado, Hulten and Sichel (Finance & Economics Discussion Series 2004-65, Federal Reserve Board).

of exports. Chart 10-3 shows the annual growth rates for the exports from U.S. copyright-based industries from 1991 to 2002. In all but one of those years (1995), exports from copyright industries grew at a faster rate than total exports. Indeed, on average, U.S. copyright exports grew faster by approximately six percentage points than total exports and have become an increasing share of our total exports.

This analysis, however, obscures an important point about the role of intellectual property in the economy and undervalues its contribution. There are many industries that are not counted among the intellectual property industries but generate innovations and rely on patent and other intellectual property protection to create incentives for innovation and growth. More importantly, many innovations from the past have led to significant productivity advances in industries such as medicines, textiles, railroads, steel manufacture, and farm equipment. The capital value of these innovations was dissipated as the intellectual property protecting these innovations expired and the innovative knowledge and information entered the public domain. Even after these innovations become public knowledge, however, the country still benefits from the productivity gains the innovations produced. Any complete consideration of the overall importance of intellectual property to the American economy should include the value of these advances. Such a consideration is beyond the scope of this chapter but would suggest that the

Chart 10-3 **Growth Rate of U.S. Exports**

Since 1991, the growth rate of copyright industries has exceeded the growth rate of overall exports.



estimates discussed above underestimate the importance of intellectual property to the American economy.

Intellectual Property Protection and Economic Growth

The protection of intellectual property rights plays an important role in inducing technological change and facilitating economic growth. Intellectual property protection does not directly lead to growth, but it helps create an incentive structure that encourages research and development, which in turn leads to increased innovation. Increased innovation generates greater rates of economic growth.

The link between improved intellectual property protection and increased innovation can be seen at the firm level for companies in developing and developed countries. One study showed that 80 percent of 377 firms surveyed in Brazil would invest more in internal research if more legal protection, such as improved intellectual property-right protection, were available. A similar study of U.S. firms showed that the availability of patent protection in the United States was a critical factor in research and development decisions. Using a random sample of 100 U.S. manufacturing firms, this study found that had it not been for the availability of patents, 60 percent of the inventions in the pharmaceutical industry and nearly 40 percent of the inventions in the chemical industry would not have been developed.

A number of other recent economic studies have shown a more direct link between greater intellectual property protection and capital investment. One study of the relationship between patent protection and investment in research and development found that countries with the lowest level of patent protection invested less than one-third of 1 percent of their GNP in research and development while countries with the highest level of protection invested six times as much. Likewise, another study suggests that increasing intellectual property protection increases capital and research investment. As intellectual property protection makes investment in research and development more attractive, the supply of knowledge is increased, lowering the cost of innovation. The increase in innovation leads to an increase in the rate at which new products are introduced, resulting in greater economic growth.

Intellectual property protection alone does not drive economic growth. There must be an existing research base in the country, a relatively unconstrained trade regime, a stable macroeconomic environment, the rule of law, and well-functioning institutions that grant, monitor, and enforce the intellectual property rights.

Intellectual Property Policy Challenges

Technological and economic change sometimes expose weaknesses in existing intellectual property laws and necessitate modifications of those laws to ensure their continued effectiveness in protecting intellectual property and ensuring economic growth. The Administration has continually reviewed and implemented policies to improve the intellectual property laws to ensure the efficiency of the patent review process, to protect the intellectual property of American firms engaged in international trade, and to prevent potentially dangerous counterfeit products from entering U.S. and foreign markets.

Ensuring the Integrity of the Patent Process

As noted earlier, patents have broader protection than copyrights or trademarks and, of these three, patents have the only formal review process prior to being granted. The effectiveness of the patent system in fostering technical progress and economic growth is tied to the efficiency of this review process. Patents granted in error may create market power without any offsetting benefit of inducing innovation. If a patent increases the cost of using existing technology, it may deter innovation or simply cause a firm to use a less-efficient technology. In 2004, the USPTO issued 187,170 patents. Occasionally a very small percentage of patents are challenged or overturned, and it is this particular process within the patent system that is examined below.

Challenging a patent's validity can be costly and time-consuming. Estimates suggest that median litigation costs average \$4 million each for the plaintiff and defendant when more than \$25 million is at stake in a patent suit. Research has found that on average it takes approximately three and a half years to challenge a patent through litigation and that the typical patent challenge is initiated after the patent has been in force for approximately eight and half years. An unwarranted patent could be in force for more than twelve years of a twenty-year term before the legal system would find it to be invalid.

Challenging a patent's validity can also be financially risky. Generally a firm cannot sue to have a patent invalidated. It must first infringe on that patent, wait for the patent holder to sue, and then claim patent invalidity as a defense to infringement. Firms that do this incur a great financial risk because intentional infringement of a patent may result in triple damages. Patents are presumed to be valid and an accused infringer must prove it is invalid by "clear and convincing evidence" to overturn this presumption. This is greater than the burden that a patent application must satisfy before a patent is issued. Despite the hurdles faced by a firm challenging the validity of a patent, researchers have found that 46 percent of the fully litigated patent challenges between 1989 and 1996 ultimately resulted in the patent being judged to be invalid.

In recent years, businesses and commentators have noted substantial increases in the number of patent applications received by the USPTO. This trend, combined with an increased availability of patents in areas such as business methods, has led some to question whether wrongly issued patents might affect the competitiveness of the U.S. economy. Patent policy can foster innovation, but must also be balanced with the consumer protection provided by competition in the marketplace.

Because of increased interest in how best to balance patent and competition interests, in 2002, the Federal Trade Commission (FTC), together with the Antitrust Division of the Department of Justice (DOJ), held extensive hearings with testimony and written comments from investors, entrepreneurs, antitrust organizations, and scholars. While hearing participants praised many aspects of the current patent system, many participants expressed concerns about poor patent quality and legal standards that may inadvertently create market power and reduce innovation.

In 2003, the FTC issued a report based on the information gained in the hearings conducted in the prior year. This report contained several recommendations to alleviate the problems discussed above. Two of these recommendations were also supported by a subsequent report issued by the National Academy of Sciences.

The first recommendation was to create an administrative post-grant appeal procedure that would allow firms to challenge the validity of a questionable patent within a limited period after it has been issued. This procedure could

significantly shorten the time period in which a wrongly issued patent is in force and reduce the risk of some patent challenges. The second recommendation was to reduce the firm's risk of triple damages in cases in which firms infringe a patent with knowledge of that patent. This change would encourage firms to read their competitors' patents more frequently, to develop noninfringing business plans, and to reduce wasteful duplication of effort.

Intellectual Property and International Trade

As intellectual property became a more important element of international trade starting in the 1980s, differences in the level of protection for intellectual property across various countries started to lead to an increasing number of trade disputes about the use and alleged misuse of the intellectual property belonging to others. These trade frictions had the potential to disrupt the benefits of increased worldwide trade. In the Uruguay Round of trade negotiations from 1986 to 1994, the members of the World Trade Organization (WTO) negotiated an agreement to introduce more order and predictability into the international protection of intellectual property rights. The WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs) is the first comprehensive and enforceable global set of rules covering intellectual property rights.

The TRIPs Agreement helps alleviate trade frictions by reducing nontariff trade barriers related to differing intellectual property protection regimes and by setting minimum intellectual property rights standards for all WTO members. The agreement established transparency standards that require all members to publish laws, regulations, judicial decisions, and administrative findings that affect the treatment of intellectual property. The agreement also requires nondiscrimination between nationals and non-nationals and for the first time applies the Most-Favored Nations (MFN) obligation (prohibiting discrimination across trading partners) to international intellectual property rights.

The TRIPs Agreement took effect in 1995, but only industrialized countries had to ensure that their laws and practices conformed to it by January 1, 1996. Developing countries and transition economies were given five years, until 2000, and the least-developed countries were given 11 years, until 2006 to comply. The 2006 deadline applicable to least-developed countries was recently extended to 2016 for pharmaceutical patents and July 2013 for other obligations. Questions remain, however, about the extent to which some developing countries are in compliance with their TRIPs obligations, and many least-developed countries are unlikely to be in full compliance by July 2013. In addition, many developed countries have implemented a variety of cost-containment efforts that greatly reduce the value of intellectual property. Thus, an apparent strong patent protection stance may, in fact, not be a completely accurate representation, at least across all industries. Consequently, the level of intellectual property-rights protection varies across countries.

Developing Countries Tend to Have Weaker Intellectual Property Regimes

Economists have developed a number of indices to determine the strength of various countries' intellectual property protection regimes. While the results of the research using these indices are not uniform, they suggest that the level of intellectual property protection increases with a country's real gross domestic product per capita. Economists have offered some explanations for this relationship. Rising income increases the demand for higher-quality, differentiated products. This increase in demand leads to growing preferences for the protection of intellectual property, such as patents, copyrights, and trademarks, which provide an innovator with certain protections when producing such products.

Countries with lower per capita gross domestic product may prefer intellectual property regimes with little or weak intellectual property protection because they believe it allows free access to information that would otherwise have to be paid for. These countries may also believe that lack of intellectual property protection allows them to access technological development through imitation and domestic efforts to build upon the existing stock of worldwide knowledge. However, the lack of intellectual property protection may slow development in these countries by inhibiting the development of domestic innovative and creative industries that generate much of the economic growth in more-developed countries. Furthermore, the ubiquity of counterfeit products that is generally associated with weak intellectual property protection may have health and safety implications because it is difficult for consumers to be certain of the origin and efficiency of medicines, machine parts, and other critical products.

Countries like the United States, with greater levels of intellectual property protection and with comparative advantages in knowledge-intensive goods and services, place a high priority on intellectual property-rights protection. Most indices of the strength of intellectual property protection tend to show that the United States is among the countries with the highest level of protection. More objective measures also suggest that the United States has a comparative advantage in knowledge-intensive goods. The United States holds one of the highest shares of global patents and has a trade surplus in intellectual property-dependent services and in royalties and license fees.

Economic Costs of Intellectual Property Theft in Foreign Markets

Theft in foreign markets of intellectual property belonging to American companies is significant. In China alone, industry estimates suggest that in 2003 and 2004 the piracy rate was 90 percent or more, which means that at least 90 percent of the existing copies of a particular work (such as CDs and DVDs) in China were produced without the copyright holder's permission. Industry estimates show that the piracy rates in Latin America were more than

60 percent and the global software piracy rate was approximately 35 percent. Some of these pirated copies are exported to the United States. Piracy is an especially serious problem for American companies because of the strong comparative advantage they hold in intellectual property-related goods.

Turning these estimates of piracy rates into estimates of lost revenues involves consideration of two factors: (1) how many copies would have been sold by legitimate producers in the absence of the pirated copies, and (2) the price that would have been charged for those copies. Without the competition from pirated copies, the legitimate holder of the copyright might have been able to sell the product for a higher price and earn higher revenues. In addition, because pirated products are generally sold at a much lower price than what a legitimate producer charges, fewer copies might have been sold if consumers had to pay the higher prices for the legitimate copies. Many estimates assume that sales of intellectual property-protected goods would correspond to the current sales of the infringing goods. Under this assumption, industry estimates suggest that in 2004 software piracy alone cost U.S. developers at least \$6.6 billion.

Preventing Global Intellectual Property Piracy

The Administration is strongly committed to addressing the issues of piracy (unauthorized copies of copyrighted materials) and counterfeiting (unauthorized reproduction of trademarked or patented goods) without sacrificing the benefits to be gained through trade and specialization. To accomplish these goals, the White House initiated the Strategy Targeting Organized Piracy (STOP!) in October 2004. The STOP! initiative brings together nine federal agencies, including the Office of the U.S. Trade Representative, the Department of Commerce, the Department of Justice, the Department of Homeland Security, and the State Department. Under STOP!, these agencies and departments have and continue to develop new tools to help U.S. businesses better protect their intellectual property, increase efforts to seize counterfeit goods at our borders, pursue criminal enterprises involved in piracy and counterfeiting, and aggressively engage our trading partners to join our efforts. Through STOP!, new forms of federal assistance are being provided to U.S. companies, increased law enforcement resources are being provided, and the Administration has developed an international law enforcement network to increase criminal enforcement abroad.

Domestically, the Department of Justice has created a Task Force on Intellectual Property and increased from 5 to 18 the number of Computer Hacking and Intellectual Property Units in U.S. Attorneys' Offices across the country. This increased to 229 (one in each Federal district) the number of specially trained prosecutors available to focus on intellectual property and high-tech crimes.

Internationally, the United States has conducted several hundred intellectual property rights enforcement and technical assistance projects around the world. The Administration has established a “Global Intellectual Property Rights Academy,” located within the USPTO, to consolidate and expand intellectual property training programs for foreign judges, enforcement officials, and relevant administrators. These programs are designed to foster respect for intellectual property, encourage governmental and rights holders’ efforts to combat infringement, and promote best practices in the enforcement of intellectual property rights. The Administration is also expanding its intellectual property attaché program at our embassies in China, India, Brazil, and Russia. These attachés will assist American businesses, advocate U.S. intellectual property policy, and conduct intellectual property rights training. STOP! objectives have also been endorsed in numerous multilateral forums including the G-8, Organization for Economic Cooperation and Development, the U.S.-EU summit, and Asia-Pacific Economic Cooperation sphere.

The Administration also created a new senior-level office of the Coordinator for International Intellectual Property Enforcement. This office will coordinate the strategies of the Federal Government to use its capabilities and resources to provide an internationally secure and predictable environment for American intellectual property.

Technological Change and Intellectual Property Reform

As technology has advanced, it has become cheaper for legitimate producers to produce many types of intellectual property-related products, including medicines, CDs, DVDs, automotive and airplane parts, and other products. Technology also holds the promise for new, more efficient means of distribution of intellectual property-related products, including digital music and video content. Producers of these products have a great opportunity to take advantage of changing technologies and a great challenge to limit the use of these technologies to legitimate producers of these products. Based on current distribution preferences, intellectual property holders have lost some control over the distribution of their products.

There are many manifestations of this loss in control. For instance, some peer-to-peer networks provided technology that enabled individuals to freely download copyrighted music from the computers of other individuals on these networks. Moreover, current technology can less expensively and more faithfully reproduce some intellectual property-protected materials than previous technologies could. These illegal copies are difficult to detect. In the United States and internationally, this has resulted in a significant increase in the production and sale of counterfeit products. These counterfeit copies may directly harm consumers through the sale of fake medicines and defective products, such as batteries, automobile parts, and airplane parts. Furthermore, in the long run, counterfeiting

harms all consumers by reducing the profitability of and the incentive to produce new and interesting innovative products and creative works.

Box 10-2: The Free Software Licensing Movement

In the early stages of computing, a number of software developers wanted to put their work in the public domain, but also wanted to prevent individuals who modified the software from limiting its accessibility. This resulted in the development of free software licensing, sometimes called open source, wherein software is licensed for free use and modification but requires that any subsequent modifications also remain available for free use and modification by others. Many of the developers of free, or open-source, software are individuals in academic environments where open and cooperative development projects are especially important. Others are hobbyists or companies that are in the business of providing computing support services to third parties.

General Public Licenses (GPLs) and other free software licenses differ from traditional commercial licenses by granting to their users the freedom to run, study, improve, and redistribute copies of the program. A GPL uses traditional copyright law to ensure that these freedoms are retained in derivative works by requiring those works to also be licensed under GPL terms. Many advocates of these types of licenses believe that they increase network benefits by creating a pool of commonly accessible work and requiring any improvements made to the original software code to be contributed to that pool. These advocates believe that by having an unlimited number of developers viewing the source code and working to modify and improve it, the quality and testing of software are improved.

GPL licensees are permitted to charge for copying or distribution of their works. Further, nothing prevents software from being licensed under both GPL and traditional licensing. Dual-licensing was developed to respond to consumers of free software who were unwilling or unable to accept the reciprocity requirements of an open-source license and were willing to pay to avoid them. Open-source licensing such as GPL licenses is just another business model of software development that has been embraced by such companies as Sun Microsystems, Intel Corporation, and IBM.

Traditional and open-source development models currently compete in the market. Different developers are motivated by different aims and have different target customers. A system that neither favors nor discourages either licensing model would best serve a market consisting of diverse customers and developers. Competition on a level playing field would ensure that the better licensing system becomes the most successful. If each system has different advantages, it is likely that both systems will survive and find success.

In November 2005, the Administration forwarded proposed legislation to Congress that would implement some of the changes necessary to respond to these technical developments. The Intellectual Property Protection Act of 2005 would strengthen intellectual property protection, toughen penalties, and increase the range of investigative tools in both criminal and civil intellectual property-law enforcement.

In the past, it might not have been necessary to sanction criminally certain types of actions because they had little impact on the level of the counterfeiting of intellectual property. For instance, while there are criminal sanctions for selling a counterfeit good, there are no criminal sanctions against giving it away. It has only recently become profitable for a company that engages in, or contributes to, infringement to give a counterfeit product away and profit from the sale of auxiliary products and services. Technically, these actions are not criminal violations, but they still diminish the value of the intellectual property to its owner. The Administration's proposed legislation provides for criminal sanctions for distributing any infringing materials for the purpose of commercial advantage, including the selling of complementary products.

Because the production of a large number of copies is now cheap and easy, it is much easier for a counterfeiter to flood the market with illegal copies. Because current intellectual property law was designed when such an action was not easily accomplished, merely possessing a large number of infringing products with the intent to sell does not necessarily constitute a crime. Only the sale of the good itself is a criminal violation. Infringers are now capable of flooding the market and imposing significant financial harm on the intellectual property holder before criminal sanctions can be applied to limit the damage from this activity. The Administration's proposed legislation modifies the law to criminalize the possession of infringing materials with the intent to sell and will help stop the sale of counterfeits before they have an injurious impact on intellectual property holders.

Conclusion

Well-defined and well-enforced intellectual property rights are an important component of the U.S. economy and an important element in fostering continued economic growth. Intellectual property differs from other more tangible property in at least two key characteristics: it is nonrival in consumption and nonexcludable. An intellectual property system creates an incentive to innovate by rewarding the developers of new inventions with the right to exclude others from using that innovation for a limited period of time. In this way, inventors can benefit financially from their innovation. Economic research supports the conclusion of the American founders that a well-defined

intellectual property system rewards innovation and fosters economic growth. By continually adapting to economic and technical change, the American intellectual property law system will continue to foster economic growth in the United States and throughout the world.

Recent Developments in Energy

Energy is essential to the U.S. economy. It provides light and heat for our homes and businesses, brings our computers and appliances to life, and powers life-saving medical devices. It propels the automobiles, buses, and trains that carry us to home, work, and school, and the aircraft that fly us from city to city. It fuels the tractors that harvest our food, the machines we use to turn raw materials into final products, and the trucks, trains, and ships that carry these goods across our Nation and around the world. All told, the United States spent about \$870 billion on energy in 2004, an amount equivalent to 7.4 percent of GDP, and was on pace to spend an estimated \$1.1 trillion on energy in 2005, or about 8.6 percent of GDP.

Over the past several decades, the U.S. economy has seen a steady decline in its energy intensity—that is, the ratio of total physical units of energy consumed per dollar of real GDP. Nonetheless, households and businesses remain keenly aware of the prices they pay for energy products and the impact of rising energy prices on their budgets and bottom lines. When prices change gradually, households and businesses have time to adapt their energy consumption levels, fuel choices, and purchases of energy-using products to new price levels. Sometimes, however, disruptions to our energy production and distribution infrastructure, such as those caused by the recent hurricanes Katrina and Rita, result in temporary but sharp price increases to which households and businesses cannot adjust quickly.

This chapter discusses energy markets—systems that connect consumers and suppliers of energy products, where prices are determined by what buyers will pay and what sellers will accept. The chapter reviews recent developments in energy markets for crude oil, refined petroleum products, and natural gas, as well as recent developments in the electricity-generation sector. It considers these developments in the context of historical experience, and offers an economic perspective on energy market, policy, and technological innovations that benefit the Nation.

The key points in this chapter are:

- Crude oil prices have risen steadily over the past several years due to growing world demand, leading to rising prices for gasoline and other refined petroleum products and stimulating further development of alternative energy sources. Recent price increases have occurred more gradually than in the past.
- Disruptions to energy supply and distribution networks can lead to sharp short-term price increases. Recent hurricanes Katrina and Rita

demonstrate that competitive markets connecting energy producers, distributors, and consumers play a central role in encouraging conservation and allocating scarce energy resources, especially during times of natural disaster or national emergency.

- The continued expansion of natural gas and other energy markets through regional and global trade can improve our economic security by increasing access to low-cost energy resources and mitigating the impacts of local energy shortages and price increases. Innovative market instruments designed to insure against market volatility can also help lessen these impacts.
- Absent policy, individual energy market participants may not have an incentive to tackle certain problems associated with their energy production and consumption. Carefully targeted policies that reduce U.S. vulnerability to energy disruptions, encourage energy efficiency, and protect the environment can therefore be beneficial supplements to markets. These policies can be made more effective and less costly when designed based on economic incentives.

The first section below provides an overview of U.S. energy sources and uses. The second section discusses the world market for crude oil. The third section examines markets for refined petroleum products, including the impact of crude oil prices on refined product prices. The fourth section considers the expansion of natural gas markets from limited geographic regions to a more global level. The fifth section describes challenges and recent changes in the electricity-generation sector, and the final section concludes with a look toward the future.

Energy Sources and Uses

One British thermal unit (Btu) is the amount of energy required to raise the temperature of one pound of water one degree Fahrenheit. The United States used approximately 100 quadrillion Btu of energy in 2004 (see Table 11-1)—the energy equivalent of about 17 billion barrels of oil or 60 barrels of oil per person. Eighty-six percent of this energy came from fossil fuels, including 40 percent from petroleum, 23 percent from coal, and 23 percent from natural gas. The remaining 14 percent of this energy came from nuclear and renewable sources, such as hydroelectric power, wind, biomass (e.g., wood and agricultural crops), and solar energy.

On the consumption side, 39 percent of total U.S. energy use in 2004 passed through the electricity-generation sector. Roughly one-third of electricity-sector energy input was converted into electricity and delivered to end-use customers. The remaining two-thirds was lost due to inefficiencies in the production and transmission of electricity. Of the 73 quadrillion Btu of energy delivered to

TABLE 11-1.— *Energy Sources and Uses, 2004*
[Quadrillion BTU]

Energy sources	Energy Uses						
	End-use sectors					Electricity sector	All sectors
	Transport	Industrial	Residential	Commercial	All end-use		
Total primary.....	27.7	22.1	7.0	4.1	60.9	38.9	99.7
Petroleum	26.7	9.6	1.6	0.8	38.6	1.2	39.8
Natural gas.....	0.7	8.7	5.0	3.1	17.5	5.5	23.0
Coal.....	0.0	2.2	0.0	0.1	2.3	20.3	22.5
Nuclear	0.0	0.0	0.0	0.0	0.0	8.2	8.2
Renewable	0.3	1.7	0.4	0.1	2.5	3.6	6.1
Electricity retail sales.....	0.0	3.5	4.4	4.2	12.1		
Total end-use	27.7	25.6	11.4	8.3	73.0		

Note: Because total primary energy consumption in 2004 was almost exactly 100 quadrillion Btu, numbers in the table can also be interpreted approximately as the percent of total primary energy consumption coming from various sectors and going to various uses. Total end-use energy consumption of 73 quadrillion Btu is less than total primary energy consumption due to electricity-sector energy losses.

Source: Department of Energy (Energy Information Administration).

end-use customers, 38 percent went to the transportation sector (to power vehicles used to transport people and goods), 35 percent went to industry (for manufacturing, agriculture, mining, and construction), 16 percent was used in residences, and 11 percent was used by the commercial sector (in business, government, schools, and other public and private organizations).

Crude Oil

U.S. crude oil consumption in 2004 was 15.5 million barrels per day, approximately 65 percent of which was imported. Crude oil is used to produce a wide array of petroleum products, including gasoline, diesel and jet fuels, heating oil, lubricants, asphalt, plastics, and many other products used for their energy or chemical content. Not surprisingly, crude oil markets are monitored closely by consumers, businesses, and governments, because the prices of petroleum-based products depend heavily on the price of crude oil.

A Global Market in Crude Oil

Crude oil can be transported long distances cheaply. Transportation costs average roughly \$2 per barrel for crude oil imported into the United States. As a result, oil prices generally are determined by the balancing of supply and demand at the global level, where prices are roughly uniform for a given grade of oil. U.S. refiners, and ultimately U.S. consumers, realize great benefit from having the option of purchasing crude oil from both nearby sources, such as Texas or Oklahoma, and from sources halfway around the globe, such as Russia or the Middle East.

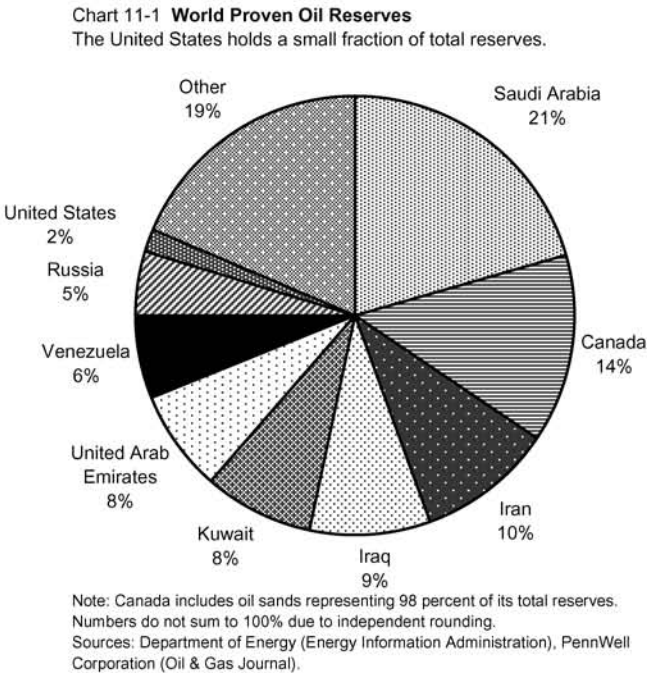
The international crude oil market is very active. Out of a total global crude oil production of 67 million barrels per day in 2002, roughly 60 percent was traded internationally. However, crude oil is produced in large quantities for export in a relatively limited number of locations around the world. In the first nine months of 2005, the top ten oil-producing countries accounted for over 50 percent of global production, and nearly 30 percent of global production originated in the Persian Gulf. Although the United States was the world's third-largest oil producer in 2004, trailing only Saudi Arabia and Russia, the United States ranks eleventh in total proven oil reserves, with just 2 percent of total proven world reserves (Chart 11-1).

Crude Oil Prices

Crude oil prices generally change gradually in response to slowly evolving domestic and international trends in oil demand and supply, though prices have spiked sharply on a limited number of occasions. Some of these spikes were short-lived, while others persisted for several years.

Recent Price Rises

Because crude oil is traded in a global market, long-term trends in demand by other consuming nations and unexpected events in other countries affect the world market price that U.S. refiners pay and the price that domestic oil



producers receive. Due to robust economic growth in the United States, China, and other high-growth countries in Asia, world consumption of petroleum products grew strongly over the past several years.

On the supply side, industrial countries have exhausted most low-cost opportunities for profitable domestic exploration and development, and international energy companies often face considerable risk when making investments for exploration, development, and production in less-developed countries. Some countries, particularly those with national oil companies, prohibit or restrict foreign investment. Consequently, new production capacity has been slow to emerge. World crude oil production in 2005 stood at about 74 million barrels per day, while the Department of Energy estimates that current world oil production capacity is only 1-1.5 million barrels per day higher—the lowest level of world spare capacity in more than three decades. Most of this spare capacity is in Saudi Arabia. As a result of this tight market, crude oil prices have increased roughly threefold since the beginning of 2002.

Past Oil Price Spikes

Although high, the current price of West Texas Intermediate (WTI) crude oil (a common pricing benchmark) is lower than the historic peak of over \$87 per barrel (in 2005 dollars) reached in 1980. Oil prices more than doubled from the last quarter of 1973 to the first quarter of 1974 as a result of the Arab Oil Embargo. Oil prices more than doubled again from mid-1979 to mid-1980 following the 1979 Iranian Revolution. Prices fell gradually from this point until 1985-1986, and then they fell rapidly after Saudi Arabia and other oil-exporting countries increased production. A short-lived shock in 1990 was associated with the Persian Gulf War. The recent increase in crude oil prices, which has come largely through a surge in world oil demand, has occurred much more gradually than past price spikes, which resulted from abrupt reductions in production in oil-exporting countries.

The Strategic Petroleum Reserve

Sudden oil supply shocks are potentially damaging to the U.S. economy. The Strategic Petroleum Reserve (SPR) provides the United States with an insurance policy should a severe energy supply disruption occur. These Federally owned crude oil stocks, which totaled 684 million barrels in late 2005, are sufficient to cover about 68 days of U.S. crude oil imports or 44 days of total U.S. crude oil consumption. The President of the United States has authorized an emergency drawdown of the SPR on two occasions: once during Operation Desert Storm in 1991, and a second time in September 2005 following Hurricane Katrina, which temporarily shut down crude oil production facilities in the Gulf of Mexico (See Box 11-2). The Secretary of Energy has also approved a number of short-term loans of SPR

oil to help companies address short-term disruptions to their operations, including after hurricanes Lili in 2002, Ivan in 2004, and Katrina in 2005. The Administration recognizes the critical importance of the SPR, and has increased SPR stocks by about 25 percent since January 2001.

Future Price Expectations and Incentives for Nonconventional Fuels

Although world oil production capacity is expected to increase, world demand is expected to increase as well, and we are likely to face tight crude oil markets for a number of years. Prices on contracts for future deliveries of crude oil (called crude oil *futures*) indicate that market participants expect oil prices to remain elevated at or near current levels through at least the end of 2006. Box 11-1 looks at the development of energy futures markets, which can help energy suppliers and users manage the risks associated with market fluctuations, and which can help facilitate investment in new conventional and alternative sources of energy.

In the longer term, an expectation of high future petroleum prices serves as a signal to potential developers of alternative fuels and producers of petroleum from nonconventional sources that investment in exploration, research, development, production, and marketing of such alternatives is likely to be profitable. Chart 11-2 presents cost estimates for commercial production of potential alternative fuels and nonconventional petroleum sources. Commercial production of some of these alternatives has already begun. For other alternatives, such as coal-to-liquids and oil shale, the technologies needed for production are not yet mature, and their production cost estimates do not include research, development, and initial demonstration costs. In all cases, the production cost estimates reflect expenditures on variable inputs (e.g., raw materials and labor), as well as capital costs for production facilities. These production costs vary widely.

Although oil prices have risen to more than \$60 per barrel in recent months, they have averaged as low as \$25 per barrel within the last five years. Having experienced past volatility in oil prices, oil companies report using a working assumption of \$15-\$30 per barrel for the future price of oil when making long-term investment planning decisions. Only a handful of alternative fuels and nonconventional sources of petroleum are profitable at these prices, including petroleum from Canadian oil sands and ethanol (when subsidized at current levels). Canada's petroleum industry reports that production of crude oil from oil sands is currently at 1 million barrels per day and is expected to approach 2.7 million barrels per day by 2015.

Ethanol—an alcohol fuel made from the sugars found in corn and other crops—can be burned by most automobile engines in the United States when blended with gasoline. U.S. ethanol production, which is supported by

Box 11-1: Energy Futures Markets

A futures contract is a legal agreement to buy or sell a particular, precisely defined commodity at a specified price and location at a specified date in the future. Trading in energy futures allows suppliers or consumers of energy to lock in a specific price at which they can sell or purchase energy products, thereby reducing or eliminating price risk. This can aid in investment planning for energy production.

The market for crude oil futures in organized exchanges, such as the New York Mercantile Exchange (NYMEX) and the International Petroleum Exchange in London, is well developed and increasing in size. For example, the quantity of oil committed under NYMEX futures contracts with maturities of three months or less increased from a value equal to 30 percent of U.S. oil production in 1997 to 80 percent in mid-2005. The expansion of markets for contracts with longer maturities is even more striking, with the quantity of oil committed under NYMEX futures contracts with six-year maturities growing from less than 1 percent of U.S. production in 1997 to 9 percent in 2005.

Although there is very little trading in crude oil futures with longer maturities, futures contracts for horizons of longer than six years can be arranged privately with the assistance of investment banks or other financial intermediaries in so-called over-the-counter transactions.

Energy futures are examples of financial instruments known as derivatives, which firms use to manage risks associated with market fluctuations. Weather derivatives also have been used by firms in recent years in order to manage risks associated with fluctuations in temperature and precipitation, which can have a significant effect on energy markets.

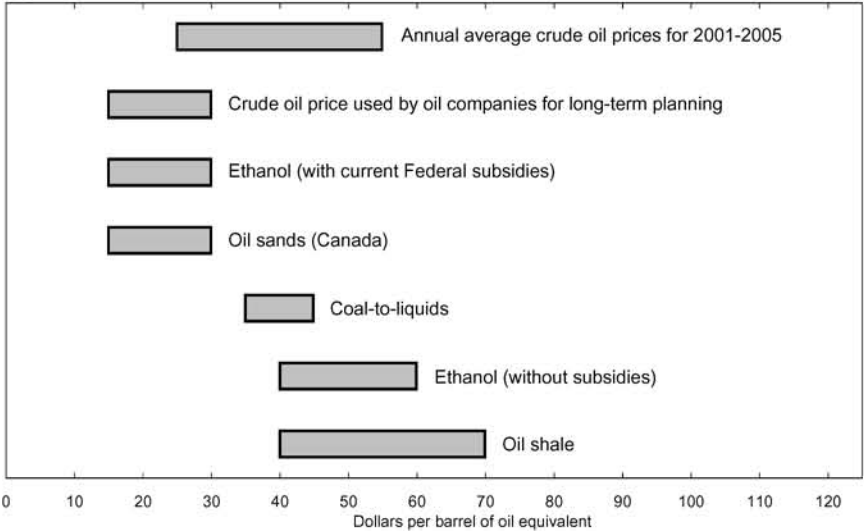
various Federal subsidies, currently stands at about 250,000 barrels per day. Ethanol production is expected to increase substantially in response to a mandate included in the Energy Policy Act of 2005 that gasoline sold in the United States contain at least 7.5 billion gallons of renewable fuels in 2012 (about half-a-million barrels per day).

Private-sector development of nonconventional fuels, such as coal-to-liquids or oil shale, may accelerate if high oil prices are sustained over the long term. For the time being, however, these alternatives are in a developmental stage and their future commercial success will depend on future energy prices, technological advances, and environmental and other regulatory requirements.

High energy prices also provide incentives for expanded domestic production of conventional oil and gas. The Administration supports greater access to oil and natural gas resources in Federal waters off shore states that support such

Chart 11-2 **Estimated Production Costs of Alternatives to Conventional Oil**

High oil prices make alternatives to conventional oil more attractive.



Note: Annual average oil prices are for West Texas Intermediate crude. Oil shale and coal-to-liquids are not currently commercial in the United States; cost estimates are for a mature industry and do not include research, development, and initial demonstration.

Sources: Wall Street Journal, Department of Energy, Department of Agriculture, Council of Economic Advisers.

development and supports opening a small portion of the Arctic National Wildlife Refuge (ANWR) in Alaska for environmentally responsible oil and gas exploration. According to estimates by the U.S. Geological Survey (USGS), the 1.5-million-acre coastal plain of ANWR and adjacent Native lands and state offshore waters hold between 5.7 and 16 billion barrels of technically recoverable reserves, with a mean estimate of 10.4 billion barrels—enough to supply 1 million barrels per day for over 28 years.

Gasoline and Other Refined Products

The United States derives approximately 40 percent of the energy it uses from petroleum, making petroleum the single largest source of energy for our Nation. Refined petroleum products, such as gasoline, diesel, and jet fuel, provide 96 percent of the energy used in the U.S. transportation sector, and are also important for the industrial sector, which gets 37 percent of its energy from petroleum. The residential sector gets 14 percent of its energy from refined petroleum products (mainly home heating oil), while petroleum supplies 10 percent of the energy used in the commercial sector.

Gasoline Prices

The prices that consumers and other end users pay for gasoline depend heavily on the prices that petroleum refiners pay for crude oil. During the first eleven months of 2005, the cost of crude oil accounted for about 53 percent of the retail price of gasoline (the most recent available data from the Department of Energy). Refining costs and profits accounted for 20 percent, Federal and state taxes another 20 percent, and distribution and marketing about 8 percent of the retail price of gasoline.

Crude oil price changes are passed directly through to consumers in the form of changing prices for gasoline and other refined products, at the rate of about 2.4 cents per gallon of refined product for every \$1 per barrel change in the price of crude oil. According to Department of Energy data, rising crude oil prices explain roughly two-thirds of the increase in average gasoline prices between 2000 and 2005.

In addition to crude oil prices, other factors have a lesser but sometimes pronounced effect on the price that consumers pay for gasoline. Refinery or pipeline shutdowns caused by damaging weather, such as hurricanes Katrina and Rita, can impede the ability of refiners to produce or distribute refined petroleum products, leading to short-term local or regional spikes in the price of gasoline and other refined products that do not coincide with spikes in the price of crude oil (Box 11-2).

Box 11-2: The Effects of Hurricanes Katrina and Rita on Energy Supplies

In late August 2005 the states of Alabama, Louisiana, and Mississippi were struck by Hurricane Katrina, a powerful storm that disrupted, damaged, or destroyed portions of our Nation's energy infrastructure. Hurricane Rita followed almost exactly one month later, while recovery from Katrina was still underway. The impact of these disruptions on prices for crude oil, gasoline, other refined petroleum products, and natural gas varied substantially, and the divergent impacts help illustrate key differences in markets for these energy sources (see Chapter 1 for a discussion of the effects on the economy generally).

Due to evacuations and subsequent damage of oil rigs and platforms, virtually all of Gulf-region oil production—about 28 percent of total U.S. production—was shut down. Because there is a robust world market for crude oil, however, the effect on world prices and the prices that U.S. refiners pay for crude oil was relatively small. The Administration approved several temporary loans of oil from the Strategic Petroleum Reserve (SPR) to help refineries offset short-term physical supply

Box 11-2 — *continued*

disruptions. The President also authorized the emergency sale of up to an additional 30 million barrels of crude oil from the SPR. These actions also helped to moderate any impact the production shut-downs had on U.S. oil supplies.

About two dozen Gulf region refineries were also shut down by flooding and electricity outages associated with the hurricanes, so that following Hurricane Rita more than half of Gulf region refining capacity and roughly one-quarter of total U.S. refining capacity were shut down. Katrina initially led to a shutdown of the Colonial and Plantation pipelines, which deliver most of the refined petroleum products consumed on the East Coast, as well as the Capline pipeline, which delivers crude oil from the Gulf region to pipeline systems serving refineries in the Midwest. After the storm passed and safety assessments revealed no damage, these pipelines began operation substantially below capacity due to electricity outages and product shortages. Hurricane Rita subsequently led to shutdowns in several other pipelines. As a result of these shutdowns of refineries and pipelines, gasoline and refined product price increases were particularly pronounced in regions served by these refineries and pipelines—namely, the East Coast, Midwest, and Gulf regions. The effects on West Coast refined product prices were less pronounced.

The International Energy Agency (IEA) of the Organisation for Economic Cooperation and Development responded by coordinating the release of IEA members' reserve stocks of petroleum. The United States made SPR crude oil available, while other IEA countries primarily offered refined petroleum products. These and other imports of refined petroleum products helped ease the impact of the hurricanes on gasoline and refined product prices, and prices declined further as petroleum refineries and pipelines came back on line.

Offshore natural gas production faced similar disruptions, with shutdowns of up to about 85 percent of Gulf daily natural gas production or 16 percent of total U.S. production. Onshore natural gas processing facilities and gathering lines were also damaged, further disrupting natural gas markets. Unlike crude oil prices, however, natural gas prices rose by over half as a result of the hurricane-related supply disruptions, due to the regional isolation of U.S. natural gas markets.

By the end of 2005, less than 10 percent of U.S. oil production capacity, less than 5 percent of U.S. refining capacity, and less than 5 percent of U.S. natural gas production capacity remained off-line, and further recovery was expected. Prices for crude oil, gasoline, and natural gas had returned to pre-Katrina levels, although natural gas prices were still experiencing volatility.

Another related factor is that surplus refining capacity has declined substantially during the last 25 years. In the early 1980s, U.S. petroleum refiners were producing at only about 70 percent of their total potential production capacity. In contrast, total refiner output has been over 90 percent of capacity for the last decade. Several factors explain this trend. First, many small, inefficient refineries exited the industry in the early 1980s following the removal of poorly conceived Federal petroleum price and allocation controls that had favored such refineries. Without these controls, inefficient refineries were no longer profitable, and total U.S. refining capacity fell by 19 percent from roughly 19 million barrels per day at its peak in 1981 to about 15 million barrels per day in 1994. Second, low profitability in the refining sector during the early to mid 1990s did not provide the necessary incentive to expand total refining capacity. Finally, local concerns about environmental quality have made it increasingly difficult to site new heavy industrial facilities, including refineries. Constraints on the expansion of refining capacity to keep pace with growing demand can lead to higher prices for refined products in the long run.

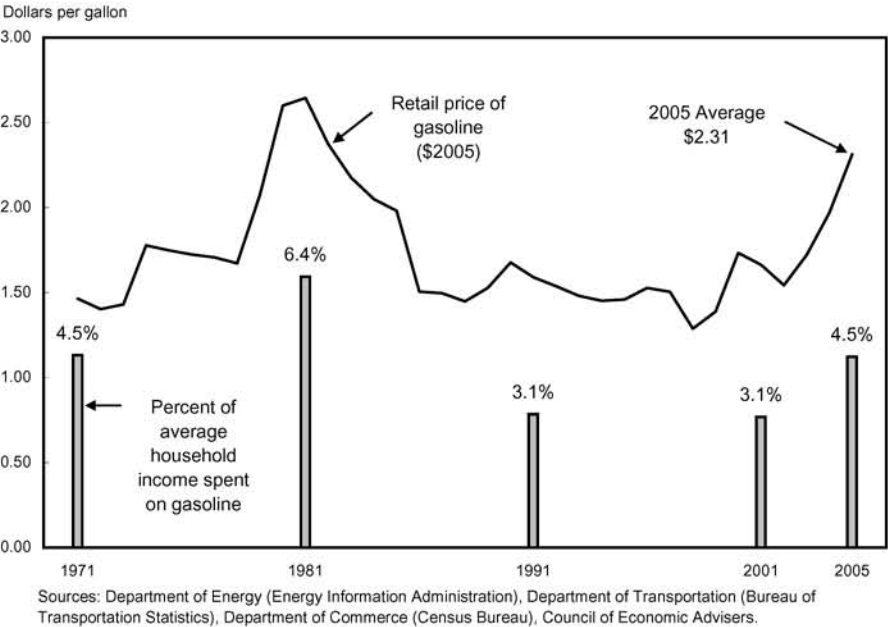
Refinery profitability increased in the late 1990s, however. As a result, domestic refining capacity rose 12 percent from 1994 to 17 million barrels per day in 2004. This increase in capacity has come exclusively through the expansion of existing refineries, as no new refinery has been built in the United States since 1976. In response to more-stringent clean-air regulations over the last two decades, much of the recent investment in refining has been directed toward increased capacity for producing cleaner fuels, even while using heavier crude oils with higher sulfur contents. Rising refinery costs and profits explain roughly one-quarter of the increase in average gasoline prices between 2000 and 2005.

Short-Run Impacts of High Gasoline Prices

When gasoline prices increase unexpectedly, households and businesses are not able to cut their gasoline consumption quickly enough to fully offset the higher costs. In the short term, then, gasoline price increases cut into household budgets and increase business costs. Price increases can have a substantial impact over the longer term, as well. Mirroring year-to-year changes in gasoline prices, household gasoline expenditures have increased recently after declining for several years from a peak of about 6 percent of mean household income in 1981 (Chart 11-3). Fuel-intensive transportation industries, such as airlines and trucking, also face substantially higher costs when prices of refined petroleum products increase.

When such price increases occur in response to a natural disaster or a failure of energy supply infrastructure, sellers are often accused of “price gouging.” Following hurricanes Katrina and Rita, which caused energy supply disruptions and price spikes, the Administration remained vigilant to pursue and

Chart 11-3 **U.S. Household Gasoline Expenditures**
High gasoline prices can burden household budgets.



investigate reports of illegal pricing practices, while recognizing that competitive markets are the most effective means for delivering energy supplies to areas of greatest need. Rising prices encourage consumers to conserve fuel and provide domestic producers and importers with incentives to increase supply. If prices are controlled artificially and not allowed to increase, however, consumers will demand more than suppliers are willing to deliver, leading to nonprice rationing (e.g., long lines) and potentially exacerbating the shortage. At least 28 states currently have statutes that address potential market manipulation in the aftermath of a disaster, and a number of these states have initiated investigations of anticompetitive behavior. The Federal Trade Commission has also launched an investigation to scrutinize the refining industry for evidence of unlawful and anticompetitive behavior.

Refining Capacity and Trade

Efficiency improvements and restructuring in the refining industry have led to lower operating costs per barrel. Excluding oil and other energy inputs, refinery operating costs fell roughly 20 percent between the early 1980s and 2003. These cost reductions tend to reduce the price of gasoline for consumers. Lower surplus capacity may, however, increase the sensitivity of

gasoline prices to temporary disruptions in production at particular refineries. When production at one refinery is disrupted, it is difficult for other refineries to compensate by ramping up production. As a result, we are more likely to see short-term spikes in the price of gasoline.

Although U.S. refining capacity and utilization have increased since the early 1990s, these increases in production have not kept pace with U.S. demand for gasoline and other refined products. As a consequence, U.S. imports of refined petroleum products, including gasoline, have grown from 11 percent of total refined product consumption in 1993 to 15 percent in 2004.

Demand for various types of petroleum products within a country and the configuration of its domestic refining capacity drive much of this international trade. For instance, Europe has moved toward consuming more diesel fuel relative to gasoline. According to industry sources, diesel-powered vehicles increased from roughly 30 percent of European new car sales in 2000 to 40 percent in 2005. This has resulted in an excess supply of gasoline at European refineries, which Europe now exports to the United States. At the same time, Europe imports diesel fuel from the United States and other countries. Likewise, other countries have differences between domestic consumption patterns and production capacity. These patterns have resulted in the United States exporting certain refined petroleum products to North America, South America, and Europe, while importing other refined products from these same countries, as well as from the Middle East and the Caribbean.

Transport costs for refined petroleum products are sufficiently low that international trading can moderate the effects of regional price spikes. For example, when supplies of gasoline and other refined petroleum products ran short in the United States following Hurricane Katrina, and prices began to rise quickly, importers responded to this price incentive by delivering significantly more product to the United States.

Price-Induced Substitution and Technological Change

In the long run, households and businesses respond to higher fuel prices by cutting consumption, purchasing products that are more efficient, and switching to alternative energy sources. Higher energy prices also encourage entrepreneurs to invest in the research and development of new energy-conserving technologies and alternative fuels, further expanding the opportunities available to households and businesses to reduce energy use and switch to low-cost energy sources.

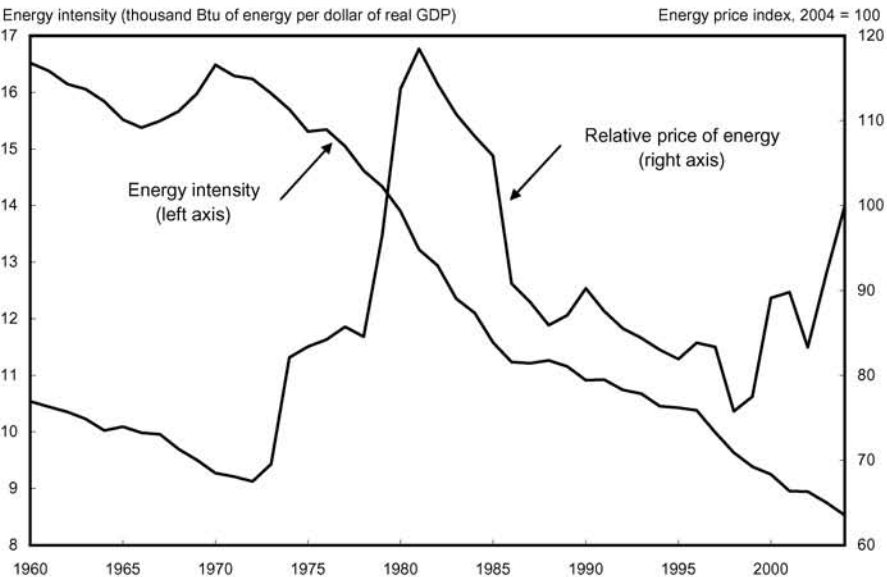
The energy intensity of the U.S. economy—that is, the ratio of total Btu of energy consumed per dollar of real GDP—has declined substantially over the past several decades (Chart 11-4). And, as one might expect, energy intensity declined most rapidly from the mid-1970s through the mid-1980s, when energy prices were at their highest in real terms. Reductions in overall energy intensity

result from both shifts in economic activity toward less energy-intensive sectors, as well as from energy efficiency improvements within particular sectors. Recent research suggests that energy efficiency improvements account for roughly one-third of the reduction in energy intensity between 1985 and 2002, after controlling for shifts in economic activity between different sectors.

Although reductions in energy consumption are made primarily in response to changes in market conditions, government policy may also play a role in facilitating improvements in energy efficiency. This role has included supporting the development of new technologies, encouraging investment in improved efficiency, and in some areas, mandating efficiency improvements to new appliances, equipment, buildings, and vehicles. For example, on-road fuel efficiency for new cars and light trucks (e.g., minivans, pickup trucks, and SUVs) increased from an average of 13 miles per gallon in 1975 to 21 miles per gallon in 2005. This rise is due in part to higher fuel prices, technological improvements, and Corporate Average Fuel Economy (CAFE) standards, which mandate fuel efficiency in passenger cars and light trucks (Box 11-3). The benefits of any such government policy must be weighed carefully against the costs to U.S. taxpayers, consumers, workers, and businesses. The Administration recently proposed new CAFE standards for light trucks in model years 2008-2011 based on a careful accounting of these benefits and costs.

Chart 11-4 **U.S. Energy Intensity**

Energy intensity decreased most rapidly during periods of high energy prices.



Sources: Department of Energy (Energy Information Administration), Department of Commerce (Bureau of Economic Analysis).

Box 11-3: Automobile Fuel Economy Standards

For three decades, Corporate Average Fuel Economy (CAFE) standards have mandated separate average fuel economy targets for passenger cars and light trucks sold in the United States, and each domestic and foreign manufacturer must meet these same targets in every model year. Congress has established a default level of 27.5 miles per gallon for passenger cars, and passenger car standards have remained at this default level since 1990. The Department of Transportation (DOT) sets CAFE standards for light trucks for each model year, and the Administration raised those standards from 20.7 miles per gallon in 2004 to 22.2 miles per gallon by model year 2007.

There are concerns that the structure of current CAFE standards encourages manufacturers to build minivans, SUVs, and other light trucks instead of cars, because the fuel economy standard for light trucks is lower than the standard for cars. This could lead to an overall decrease in average fuel economy. There are also concerns that manufacturers might meet higher CAFE targets primarily by reducing vehicle size and weight, rather than by applying fuel-saving technologies, and that these size and weight reductions could have a negative impact on the safety of vehicle occupants.

Motivated by these concerns, DOT has proposed a new CAFE rule for light trucks for model years 2008-2011 (to be finalized by April 2006) that incorporates two notable reforms. First, DOT has proposed that CAFE standards for light trucks depend on vehicle size, whereby smaller light trucks will face higher fuel economy standards than larger light trucks. Size-dependent CAFE standards will reduce the incentive to build light trucks instead of cars, discourage manufacturers from achieving CAFE standards only by selling smaller vehicles, encourage greater fuel savings in small light trucks, and spread the burden of achieving CAFE standards more evenly across manufacturers. Second, proposed standards for 2011 would be set using a new economic model developed by DOT that sets CAFE standards to maximize economic benefits minus costs—a milestone in the use of benefit-cost analysis in the rule-making process. The model takes into account the impact of mandated fuel economy improvements on vehicle costs, the value of fuel savings, environmental benefits and costs, and other factors. The proposed rule will save an estimated 10 billion gallons of fuel over the lifetime of the light trucks affected by the rule.

The Administration has requested authority from Congress to implement further reforms to the CAFE system, including utilization of market-based incentives, such as trading of fuel economy credits, to obtain fuel savings at the lowest possible cost to consumers. The Energy Policy Act of 2005 signed by the President calls for a report on CAFE reform ideas to be delivered to Congress within one year.

Reform of the New Source Review Program

Unfortunately, government mandates sometimes lead unintentionally to outcomes that are contrary to their environmental goals. An example of this is the New Source Review (NSR) component of the 1977 Clean Air Act Amendment. NSR requires that new refineries, electric generating units, and other industrial sources of air emissions apply the best-available air emissions control technology. Existing facilities that undertake significant modifications are also required to apply the best-available technology. NSR requirements were designed to ensure that new emissions sources are appropriately controlled so that the local air quality is not compromised. Unfortunately, NSR has led over time to sources seeking to avoid its requirements because the permitting process was complicated, potentially expensive, and time-consuming, especially for sources modifying their facilities. This can provide an incentive for existing sources of emissions to continue their business operations for longer than would have been the case under normal market conditions without the regulation. It also provides an incentive for existing plants to forgo modifications.

New production sources tend to be less polluting than old ones even in the absence of regulations, so extending the business operations of older plants without making modifications could result in higher emissions. Applying different regulations for “routine” versus “major” modifications also leads to ambiguity, litigation delays, and uncertainty in business planning, all of which can harm the economy and may impede environmental improvements. The Administration recently addressed this problem by establishing clear rules that remove disincentives for facilities to modify and undertake routine equipment replacement activities that could improve the safety, reliability, and efficiency of the plants. The Administration also established rules that provide facilities with greater flexibility to modernize their operations without increasing air pollution, encourage the installation of state-of-the-art pollution controls, and base NSR requirements more accurately on actual facility emissions levels. These changes will help to address the extreme demands being placed on our Nation’s energy supply infrastructure by assuring that the NSR program provides greater regulatory certainty and flexibility for business investment decisions, while protecting the environment.

Natural Gas

Nearly a quarter of U.S. energy consumption is supplied by natural gas. Natural gas has numerous uses in homes, industry, commerce, electricity production, and transportation and is a vital component of fertilizer and chemical production. The United States consumed 61 billion cubic feet of

natural gas per day in 2004: 38 percent in industry (roughly one-tenth of which was used as a feedstock), 24 percent in electricity generation, 22 percent by households, 13 percent in the commercial sector, and the remaining 3 percent in transportation. U.S. natural gas consumption is projected to grow to 74 billion cubic feet per day by 2025.

Natural gas is produced from underground reservoirs that are sometimes associated with crude oil; much smaller amounts are generated from landfills, coal mines, and other sources. Domestic onshore production totaled about 42 billion cubic feet per day in 2004, while offshore production totaled 12 billion cubic feet per day. Total domestic production of 54 billion cubic feet per day is enough to heat about 300 million typical Midwestern homes for one year. After extraction, natural gas is processed to remove impurities (e.g., heavier hydrocarbons) and distributed via pipelines to retailers and eventually to end-use consumers in all sectors of the economy.

Regionalized Natural Gas Markets

Unlike crude oil, which trades on a global market at roughly uniform world prices, the current natural gas marketplace is highly regionalized. As a point of comparison, about 60 percent of global crude oil production was traded internationally in 2002, whereas only 28 percent of global natural gas production was traded. These differences stem from relatively high shipping costs for natural gas and a less-developed infrastructure for natural gas trade. International trade in natural gas occurs mainly within the regions of North America, Western Europe/Russia, and Asia-Pacific/Japan, each with its own unique pricing system and other market characteristics.

In North America, pipelines move natural gas between the United States, Canada, and Mexico with subregions of the continent supplying the majority of their own consumption needs. U.S. net imports of natural gas were 9.3 billion cubic feet per day in 2004, representing 15 percent of total U.S. natural gas consumption. Most imports came by gas pipeline from Canada. Only a relatively small amount was imported from beyond North America, as liquefied natural gas (LNG) from Trinidad, Algeria, and other countries. The United States also exports small amounts of natural gas to Canada and Mexico by pipeline and to Japan as LNG from Alaska.

Natural Gas Prices

Wholesale natural gas prices at Henry Hub on the Louisiana Gulf coast (a common natural gas pricing benchmark) averaged around \$2-\$3 per million Btu from 1994 through the middle of 2000. One million Btu of natural gas is equal to about one thousand cubic feet of natural gas. Prices then spiked to a peak of \$10.50 per million Btu in December of 2000 in response to an

unusually cold winter before falling back to their previous low levels. Prices have increased substantially since then from roughly \$3 per million Btu in early 2002 to over \$10 per million Btu in November 2005. Prices rose roughly in tandem with crude oil prices due to the presence of close substitution possibilities between natural gas and oil in power production and heating, though there have been some bumps along the way. Prices spiked to a peak of \$19 per million Btu in February 2003 in response to another unusually cold winter, rose as high as \$15 per million Btu in September 2005 following hurricanes Katrina and Rita, and increased to over \$15 again in December 2005 with the onset of cold temperatures.

Volatility in Natural Gas Prices

Regionalization reduces the frequency and extent to which natural gas price spikes in other regions affect U.S. natural gas prices. However, the absence of a robust international market for natural gas also makes the United States more susceptible to price shocks within our own region. Disruptions to supply or increases in demand may necessitate large price changes to reestablish equilibrium between regional supply and demand. Opportunities for the import of natural gas from other regions would dull these sharp price spikes, although localized price spikes in some regions will likely never be eliminated completely due to limitations in the natural gas distribution infrastructure.

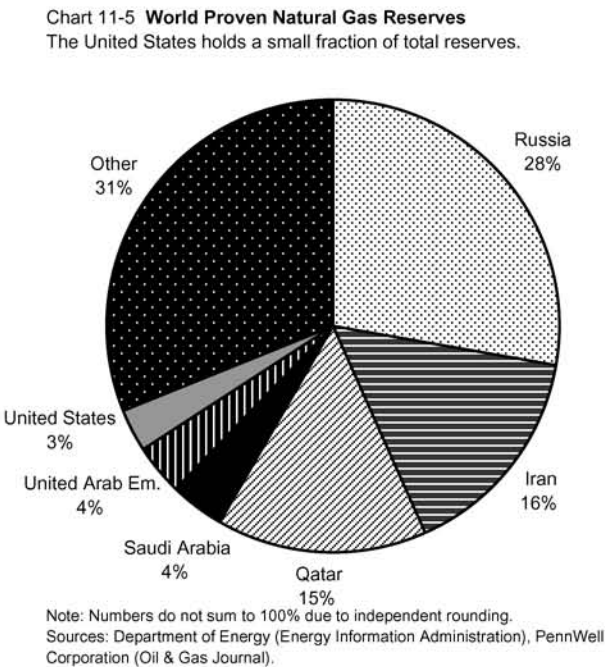
Volatility in natural gas prices in the United States is often related to extreme and unexpected weather events. In the summer months, for example, periods of extreme heat drive up demand for electricity to power air conditioners, leading to increased demand for natural gas for electricity production. Droughts and periods of low rainfall deplete resources for hydroelectric power generation and may require increased use of natural gas for replacement electricity generation. In the winter, periods of extreme cold drive up demand for natural gas for heating. Hurricanes, floods, and other severe weather events may shut down natural gas production and processing facilities and pipeline distribution networks, leading to supply disruptions.

Liquefied Natural Gas

Liquefied natural gas (LNG)—natural gas in liquid form—is expanding natural gas markets to a more global level, which in the future holds potential to moderate some of this price volatility. LNG is created by cooling natural gas to minus 260 degrees Fahrenheit, at which point it turns into a liquid, significantly reducing its volume. Specially manufactured double-hulled ships are then able to transport LNG over long distances at lower cost than pipeline transport of natural gas. Upon reaching port, LNG is pumped into a receiving terminal where it is converted back into gas (regasified) and then distributed to consumers via pipeline.

Although some inter-regional movement of natural gas does occur, three key factors have limited the development of a full-scale international market. First, natural gas resources are widely distributed internationally, which at least until recently, has limited the need of many countries to import natural gas from distant sources. Second, it is still costly to transport natural gas as LNG over long distances, which means that regional price differentials need to be large before international trade is cost-effective. Finally, natural gas price differentials are now high enough to justify long-distance shipping of LNG, but the infrastructure for liquefying natural gas into LNG is not well developed in many countries with natural gas supplies.

Although the United States has been able to maintain a high level of natural gas production, North America holds only 4 percent of proven world reserves, including 3 percent of world reserves in the United States and 1 percent in Canada (Chart 11-5). Assuming U.S. demand continues to increase, the need for imports from sources outside the region will grow. At present, it appears that LNG is the best means for importing natural gas from beyond North America, and current Department of Energy projections are that LNG imports from various regions will increase from about 3 percent of U.S. natural gas consumption in 2004 to 15 percent by 2025.



LNG Conversion and Transport Costs

A truly global market for natural gas will require transporting natural gas over long distances, and LNG is superior to pipeline transport in this regard. Currently, pipeline transport is less expensive than LNG for distances up to about 1,300 miles in the case of offshore pipelines and up to about 2,400 miles in the case of onshore pipelines. Beyond these distances, LNG transport in tankers is less expensive.

In addition to the cost of extracting and processing natural gas at the supply source, LNG must be liquefied, transported via special tanker, and then turned back into gas upon arrival. The costs associated with liquefying LNG have decreased between 35 percent and 50 percent over the past ten years, while transport and regasification costs have also fallen. These costs are still high enough, however, that U.S. natural gas prices need to exceed wellhead prices in LNG-supplying countries by at least \$1.50 to \$3 per million Btu—roughly \$9 to \$17 per barrel of oil equivalent—before LNG transport is cost-effective. As these costs continue to fall, the international marketability of LNG will grow.

U.S. LNG Terminal Capacity

Total LNG import costs are about \$2-\$4 per million Btu, which is far below current domestic natural gas prices. Given sufficient LNG infrastructure capacity, therefore, domestic prices eventually could be reduced through increased imports. Over 150 LNG tankers were in operation in 2003, and another 50 are under construction. Currently, there are five existing LNG import terminals in the continental United States (four onshore and one offshore), and these facilities operated at about 40 percent of capacity in 2005. About a dozen additional terminals have been approved, and about 20 others have been proposed. The recent Energy Policy Act of 2005 signed by the President took steps to remove unnecessary impediments to siting LNG terminals by clarifying the role of the Federal Energy Regulatory Commission (FERC) as the lead agency for coordinating authorization of onshore LNG terminals and LNG terminals in state waters. Federal approval of projects will continue to be conditional on state approval under various environmental laws.

With ample capacity in both shipping and receiving, the current bottleneck in LNG imports to the United States is an insufficient supply of overseas facilities for liquefying LNG. As long as capacity for liquefying LNG is in short supply abroad, there will be great competition in international markets for LNG cargoes, as is already happening among the major importers of LNG, including the United States, Japan, Spain, and other countries. Not surprisingly, high natural gas prices in these and other countries have led to an expansion of capacity to liquefy LNG abroad. Qatar, which has 15 percent of proven world natural gas reserves, recently began exporting LNG. The

12 nations that currently export LNG hold more than one-quarter of proven world reserves, and some of the world's largest natural gas exporters are in the process of constructing plants to develop LNG export capacity, including Russia and Norway.

Future Prospects for an International LNG Market

Currently, LNG markets are undergoing a substantial evolution, with demand growing and strong future growth expected. Between 1993 and 2003, international LNG trade grew at an average annual rate of 7 percent, and global LNG capacity is expected to grow by more than one-third between 2003 and 2007. Although international trade in LNG is expanding, the market has not yet evolved to the point where it can respond fully to price spikes in North America and other regional markets. The market for prompt delivery of LNG “spot cargoes,” although growing, is still less than 10 percent of world LNG trade, with most LNG cargoes delivered under long-term contracts.

Prospects for Domestic Production of Natural Gas

The emergence of international natural gas markets does not eliminate the need to develop domestic production. Greater domestic natural gas production holds promise both in Alaska and on the outer continental shelf (OCS)—Federally controlled offshore areas within the 200-mile exclusive economic zone of the United States but beyond the 3-mile zone under state jurisdiction—as well as other areas. A difficulty in Alaskan production has been the lack of infrastructure to transport remote natural gas resources to market, which would be solved by development of the Alaska natural gas pipeline to the lower 48 states. The Alaska Natural Gas Pipeline Act signed by the President in October 2004 established an expedited Federal approval process for construction of the pipeline, and FERC has been working with state, Federal, and Canadian agencies to establish a framework for coordinating permitting activities.

The OCS has vast additional natural gas resources. Proven Federal offshore reserves as of 2003 were about 23 trillion cubic feet—12 percent of total U.S. proven reserves of 189 trillion cubic feet. The Department of Interior estimates the OCS also contains 400 trillion cubic feet of undiscovered, technically recoverable natural gas. About 20 percent of this natural gas—80 trillion cubic feet—is currently subject to Federal offshore leasing moratoria. The Administration supports greater access to natural gas and oil resources in Federal waters off shore of states that support such development. This would open up substantial additional natural gas supplies for the Nation.

Electricity

Although 39 percent of total U.S. energy consumption in 2004 passed through the electricity-generation sector, only about one-third of electricity-sector energy input was converted into electricity and passed on to end-use customers (Table 11-1). The remaining two-thirds was lost due to inefficiencies in the production and transmission of electricity. Some of these losses could be avoided through further efficiency improvements, though most are unavoidable due to the physics of electricity production and transmission. Retail electricity consumption is divided roughly equally among the residential, commercial, and industrial sectors. The residential sector consumed 36 percent of this electricity for lighting, heating, air conditioning, and powering household appliances, while 35 percent went to the commercial sector for similar uses. Industry consumed 29 percent, and less than 1 percent went to the transportation sector to power electric rail transport.

Electricity-Generation Technologies

A range of energy sources and technologies are used to produce electricity. A total of 71 percent of generated electricity comes from fossil fuels, including 50 percent from coal, 18 percent from natural gas, and 3 percent from petroleum. Nuclear power provides about 20 percent of electricity, while hydroelectric power provides 7 percent, and other renewable sources, such as wind, biomass, and solar, provide a combined 2 percent.

With the exception of solar power and diesel-powered internal combustion engines, all electricity is generated by the turning of turbines that drive electric generators. Falling water drives the turbines in a hydroelectric plant, and wind turns the turbine of a windmill. Natural gas plants use a combustion process like that in a jet aircraft engine to generate a high-speed stream of combustion gases, which is used to drive a natural gas turbine. In natural-gas-combined-cycle plants, exhaust gases exiting the gas turbine are used to heat water, which generates high-pressure steam that drives a second turbine. Nuclear and conventional coal plants generate high-pressure steam to drive turbines by heating water using the energy released by nuclear reactions and coal combustion, respectively. Advanced coal-fired generating plants use various alternative technologies to enhance efficiency and cut emissions. Combined heat and power plants can very efficiently generate steam or hot water for heating and production processes, as well as for electricity.

The Real-Time Challenge of Electricity Markets

Most fuels, such as gasoline, home heating oil, or natural gas, can be manufactured and then stored for later distribution and use. Unlike these energy

sources, however, the generation and consumption of electricity must match exactly in real time. Although it is possible to store electricity in batteries, storing electricity on a large scale is too costly. If generation fails to provide the energy needed to satisfy demand, the electricity production and distribution network can become unstable, leading to outages or system failures. Shutdowns of generating plants in one location can therefore affect the entire network, as was the case in August 2003, when a plant shutdown in Ohio triggered cascading failures that ultimately forced the shutdown of at least 265 power plants. These shutdowns left an estimated 50 million people in the United States and Canada without power and led to economic losses of \$4-\$10 billion in the United States and noticeable downturns in Canadian hours worked, manufacturing shipments, and economic output. The Federal government took a number of actions after the blackout to diminish the risk that a similar disruption would occur in the future.

The demand for electricity fluctuates with the seasons and during the course of each day. For example, the hot summer months bring increased demand for electricity to power air conditioners, and electricity demand peaks each afternoon and drops to its lowest level late at night. Because the production and use of electricity must match in real time, electricity generation fluctuates one-for-one with these seasonal and daily consumption patterns. Electricity-generating capacity is tuned to match these fluctuations. Plants that have low operating costs or that are difficult to turn on and off, such as nuclear and coal-fired steam plants, provide the “baseload” power that is used all day every day. Plants that have higher operating costs or that can be started up quickly, such as natural gas turbine plants, start up incrementally as electricity demand increases and peaks, with some units remaining idle for much of the day or even much of the year. Hydroelectric plants, which have low operating costs and can be started quickly, are suitable for both baseload and peak electricity production.

These fluctuations can have impacts in other energy markets. Reduced hydroelectric power due to low rainfall and falling reservoir levels can increase demand for electricity from natural gas. Likewise, particularly hot summers increase electricity demand to power air conditioners, increasing demand for natural gas as gas-powered generators come on line. If the weather is drier or the summer is hotter than marketers of natural gas anticipate, stored levels of natural gas will be low relative to unexpectedly high demand, and natural gas prices will increase.

Real-Time Pricing and Other Reforms

Because electricity-generating units are dispatched incrementally in order of increasing operating cost, the marginal cost of producing electricity—that is, the additional cost of producing one additional unit of electricity—is

highest during periods of peak production and lowest during periods of low production. In practice, however, most retail customers pay a fixed seasonal rate for the electricity they use and thus have no incentive to reduce their consumption of electricity during the times of day when it is most costly to produce. As a result, electricity producers must invest in generating units that remain idle most of the time, and the capital costs of these units are passed on to consumers in the form of higher average prices. Constraints in the electricity transmission system, which limit the extent to which electricity can be directed to areas of high demand or low supply, can also lead to high electricity prices in some regions.

The recent Energy Policy Act of 2005 signed by the President addresses the issue of inefficient pricing by requiring electric utilities and competitive retailers to offer customers time-based rates by February 2007. By ensuring that electricity suppliers offer their customers rates that better reflect the cost of electricity generation, these provisions will encourage consumers and businesses to conserve electricity during times of peak demand. This will reduce the need for excess generating capacity that remains idle most of the time and will, as a result, lower average electricity bills for retail customers. The Act also establishes energy-efficiency standards for household products and Federal buildings, which will reduce consumption of energy.

Environmental Protection

Combustion of fossil fuels, coal in particular, generates sulfur oxides and nitrogen oxides, which contribute to poor air quality if not controlled. Currently, emissions of sulfur and nitrogen oxides from electric utilities are regulated under the 1990 amendments to the Clean Air Act, which established a cap-and-trade system of tradable permits that holds total annual emissions to a mandated level at low cost. See Box 11-4, which includes a discussion of the Clean Air Interstate Rule and the President's Clear Skies proposal, which calls for a further 70 percent reduction in air emissions.

Fossil fuel combustion also generates emissions of carbon dioxide and other greenhouse gases, which contribute to the warming of the Earth's surface. The Administration is supporting the development of various technologies that will improve power plant efficiency, while greatly reducing air pollution and greenhouse gas emissions. For example, the Department of Energy is supporting research and development of technologies that turn coal into a highly enriched hydrogen gas, which can be burned much more cleanly than burning coal directly or can be used as an industrial feedstock. These technologies also provide opportunities to remove and sequester emissions of carbon dioxide and air pollutants prior to combustion. In February 2003 the President announced FutureGen, a government-industry partnership to build a prototype fossil fuel power plant that will demonstrate these technologies.

Box 11-4: Cap-and-Trade Programs for Air Pollution

Title IV of the 1990 Clean Air Act Amendments established a national cap-and-trade system for sulfur dioxide (SO₂) emissions. SO₂ emissions, which are generated by the burning of fossil fuels—such as coal in an electric power plant—can lead to health concerns and are a component of acid rain. Title IV's program caps total allowable SO₂ emissions from power plants nationwide and requires that each facility own a permit for every unit of SO₂ it emits. The Environmental Protection Agency (EPA) monitors and enforces this cap rigorously.

Under the Title IV program, SO₂ permits can be bought and sold by emitting facilities. Trading allows facilities with high pollution-reduction costs to purchase permits from facilities with low reduction costs, thereby allowing the power industry to achieve mandated emissions reductions in a cost-effective manner. The program does not tell power producers how to reduce pollution, but rather they are free to choose the most cost-effective method for achieving reductions.

The SO₂ trading program has been very successful at reducing emissions at a lower cost than direct plant-level emissions standards. The compliance has been nearly 100 percent, and research shows the trading program saves U.S. power producers hundreds of millions of dollars per year relative to direct plant-level standards. Thus, cap-and-trade programs promote clean air while reducing the cost impact on energy consumers. A similar regional cap-and-trade program exists in the eastern United States to control nitrogen oxide emissions, which contribute to regional ozone and smog problems.

In 2002, the President proposed "Clear Skies" legislation, which would expand the Clean Air Act Title IV cap-and-trade approach for SO₂ to also include nitrogen oxide and mercury, reducing these emissions to roughly 70 percent below 2000 levels by 2018. As Congress has not yet enacted Clear Skies, the EPA has sought to achieve much of the benefits of the Clear Skies legislation by issuing the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR) in March 2005. CAIR requires 28 states in the eastern half of the country to regulate power plant emissions of SO₂ and nitrogen oxides and encourages them to do this within the framework of an interstate cap-and-trade system. When fully implemented, CAIR will reduce power-plant SO₂ emissions in these states by over 70 percent and nitrogen oxide emissions by over 60 percent from 2003 levels. CAMR is the first-ever regulatory action to reduce mercury emissions from coal-fired power plants and includes a cap-and-trade approach as a way of achieving nearly 70-percent reductions in mercury emissions.

The Administration is also supporting further development of renewable sources of electricity, such as wind, solar energy, and biomass (e.g., wood and agricultural crops), which generate little or zero net greenhouse gas emissions. Finally, the Administration is supporting the development of nuclear power, which does not generate air pollution or greenhouse gases. The Nuclear Power 2010 program is a cost-shared government-industry partnership to identify sites for new nuclear power plants, improve nuclear technologies, and demonstrate untested regulatory processes. The Generation IV nuclear power program supports the development of future technologies with reduced capital costs, enhanced safety, minimal waste, and reduced risk of weapons materials proliferation.

Electricity Markets in Transition

The electric power industry has gone through a transition over the past several decades, evolving from a highly regulated, monopolistic industry to a less regulated, more competitive industry. Traditionally, electric utilities owned and operated electricity-generating units, transmission lines, and distribution systems, and were the sole providers of electricity to a specific geographic area. Federal legislation and rule-making activities during the last decade, however, have opened up access to transmission lines and encouraged greater wholesale trade of electricity between generators and retailers. The market changes vary from state to state and are dynamic, with continual adjustments being made as problems emerge. Some states continue to operate under a traditional, integrated market structure, others are striving to encourage greater competition among generating companies, and some even have opened up competition between electricity retailers.

Recent Electricity Market Policy Reforms

Successful operation of the electric power system requires coordination among system participants. Competition can lead to better products and lower costs for consumers. Ensuring the benefits of competition and reliability are therefore key components of successful reform. Provisions in the Energy Policy Act of 2005 signed by the President promote competition and investment in transmission infrastructure by providing for reasonably priced access to transmission grids, while providing for the establishment of mandatory reliability rules for the electric system. In order to further reduce costs and increase reliability, the Act repealed the Public Utility Holding Company Act (PUHCA), which restricted the ability of regulated utilities to invest in electricity infrastructure, and amended the Public Utility Regulatory Policies Act (PURPA) to allow utilities greater flexibility to purchase wholesale electricity from producers with lower costs. The Energy Policy Act of 2005 improves market competition by promoting the dissemination of information

about the availability and prices of wholesale electricity and transmission services. The Act also protects consumers by banning market manipulation, unauthorized disclosure of consumer information, and unfair trade practices, such as changing the electricity service providers chosen by consumers without their consent.

Conclusion

Today, most of our energy comes from petroleum, coal, and other fossil fuels. There are constraints on supplies of these resources in the short term. Increased scarcity and rising prices over time will encourage conservation, increase incentives for exploration, and stimulate the development of new, energy-efficient technologies and alternative energy sources. In the near term, unexpected disruptions to energy supply and distribution networks may continue to impact consumers and businesses. The recent hurricanes Katrina and Rita demonstrated that competitive markets play a central role in allocating scarce energy resources, especially during times of natural disaster or national emergency. The continued expansion of energy markets through regional and global trade can further increase our resilience to energy supply disruptions. Finally, individual energy market participants do not always have an incentive to tackle problems associated with the production and consumption of energy, such as environmental damage or the potentially damaging effects of energy price spikes on the U.S. economy. Policies that reduce U.S. vulnerability to supply disruptions, encourage energy efficiency, and protect the environment can therefore be beneficial supplements to markets. Policymakers can design these policies to be more effective and less costly by harnessing the power of economic incentives and aiming to minimize distortion of normal market forces.