CHAPTER 1

THE MAKING OF A NEW ECONOMY

OVER THE PAST EIGHT YEARS, the American economy has transformed itself so radically that many are heralding the creation of a New Economy. After two decades of disappointing performance, the economy roared back with the most prosperous period in the nation's history. There has been strong, accelerating growth in real GDP; declining and then very low unemployment; and stable and low rates of core inflation (Chart 1). We are in the longest expansion on record and the first long expansion in recent history that has become stronger over time.

CHART 1 HERE

From the first quarter of 1993 through the third quarter of 2000, real GDP has grown at an annual average rate of 4.0 percent. This rapid growth, which is almost 40 percent higher than the average over the prior two decades, reflects both strong job creation and faster productivity growth. Americans are working in record numbers. The employment-to-population ratio reached an all time high in 2000. Since 1993, the number of payroll jobs has increased by over 22 million. The unemployment rate dipped to 3.9 percent in 2000, the lowest level in a generation, with unemployment rates for African Americans and Hispanic Americans the lowest on record.

Americans are not only working more; they are working smarter. The economy has rapidly become more productive. Since 1993, output per hour in the non-farm business sector grew at 2.3 percent a year, compared to the prior trend of 1.4 percent. Even more remarkably, since 1995 productivity growth has been over 3 percent a year. This acceleration in productivity growth has produced higher incomes and greater wealth: since 1993 American households have experienced the longest sustained increase in their average incomes on record, and the value of equities has trebled.

The income gains have not only been strong, but widely shared (Chart 2): in particular, incomes at the bottom of the distribution have risen rapidly. The situation of the disadvantaged has been transformed. The overall poverty rate declined to 11.8 percent in 1999 (the most recent year of data), the lowest level since 1979, down 3.3 percentage points since 1993. The poverty rate for African American households was 23.6 percent in 1999 – still too high, but far below the level of 33.1 percent in 1993. The poverty rates for Hispanic Americans and elderly Americans have also fallen substantially.

CHART 2 HERE

New Trends. These outcomes are particularly remarkable because they took most people by surprise. They represent a marked change from the experience of the prior two decades, in which the economy was plagued by persistent inflation, high unemployment, slow growth, sluggish productivity growth, rising inequality, and large budget deficits.

Stagflation was an unwelcome problem in the 1970s, as two major oil shocks were followed by inflation and recession. The massive and costly recession of the early 1980s and the collapse of oil prices in 1986 broke the back of the very high inflation rates that emerged in the late 1970s, but as unemployment fell below 6 percent in the late 1980s, core inflation started to climb again. *It seemed impossible to simultaneously achieve both low inflation and low unemployment.*

Between 1973 and 1993, real GDP growth averaged a modest 2.8 percent, 30 percent lower than the growth from 1993 to 2000. While growth during these two decades was boosted by large numbers of women and baby-boomers, it was seriously hurt by the persistence of low productivity growth, averaging less than half the postwar average.

The combination of slow productivity growth and a relatively loose labor market dragged down household incomes, especially for those at the bottom of the income distribution. Earlier the trend of poverty among U.S. households had been downwards, as economic progress gradually lifted the incomes of those at the bottom. The poverty rate, which had been 22.2 percent in 1960, had fallen to a low of 11.4 percent by 1978. Although the poverty rate fluctuated with the business cycle in subsequent years, the trend of improvement ended. In the cyclical peak year, 1989, the poverty rate was still 12.8 percent, well above its 1978 low. By 1993 the rate had risen to 15.1 percent, almost matching the 15.2 percent of 1983, the worst rate since the 1960s.

Federal budget deficits had become commonplace in the 1970s, but they really took off in the 1980s with a fiscal policy based on overly optimistic budget forecasts. There was a modest step toward fiscal discipline taken in 1990, but the timing was bad with a weakening economy; in the event, deficits got worse, not better, after 1990, reaching almost $300 billion in calendar year 1992. At the end of fiscal year 1981, federal debt held by the public was 25.8 percent of GDP. By the end of fiscal year 1993, it had risen to an alarming 49.4 percent.

In 1993, therefore, few people believed the U.S. economy could combine low unemployment rates and moderate inflation. Few believed the economy could sustain productivity growth greater than 1.5 percent per year. Few believed that the Federal Government could eliminate its budget deficits, and few believed that U.S. incomes could grow more rapidly than those in other major industrial countries. Yet all of these seemingly improbable events occurred – and at the same time.

Typically, as the economy has reached full employment, core inflation has accelerated; yet despite 4 percent unemployment, the core inflation rate has remained in the 2-3 percent range. Typically, as expansions have been prolonged, productivity growth has slackened; yet as this expansion has matured, productivity growth has accelerated. Typically, as expansions have been sustained, the Federal fiscal policy has become more expansionary, yet over the past 8 years the budget has moved steadily from a record level of deficit to a record level of surplus. Typically, per capita incomes in countries behind the technological frontier may be expected to grow more rapidly than the technology leader; yet over the second half of the 1990s, the U.S. economy had both the highest income and the fastest growth among the major industrial nations.

These aggregate data reveal clearly changes in economic trends that are fundamental and surprising and, in our view, justify the term "New Economy." Three major interrelated drivers brought about these changes.

The first driver was a dramatic increase in technological innovation, particularly in information technology (IT) and its applications. While IT has long been important to the economy, in the early 1990s simultaneous advances in computers, software, and telecommunications allowed these elements to be combined in ways that dramatically increased their economic potential.

The second driver was a set of organizational changes implemented by U.S. entrepreneurs to reconfigure their existing businesses and start new ones, in part to realize the potential of the new technologies. These changes included new production methods and human resource management practices; new relationships with suppliers and customers; new business strategies, some expanding the scope of the enterprise through mergers and acquisitions, others slimming down the firm-to-core competencies; and new forms of finance and compensation.

The third driver was public policy creating an environment in which these new technologies and organizational changes have flourished. More specifically, the Administration embraced policies and strategies based on fiscal discipline, investing in people and technologies, and opening new markets at home and abroad.

The interactions among these drivers have created virtuous circles in which developments in one area have reinforced developments in another, creating a system in which the whole is more than simply the sum of its parts. New technologies have certainly created opportunities for organizational innovations; these innovations have, in turn, stimulated the demand for new technologies. Increased growth prompted by new technologies has allowed the Federal Government to restrain its spending growth and increase its revenues; the smaller budget deficits have consequently led to lower interest rates and further investment in new technologies. The economic policies directed towards promoting competition have stimulated firms to adopt the new technologies, spurring other firms to innovate. Likewise, the policies opening foreign markets have allowed the U.S. technology sector to become more innovative through increased foreign earnings. They have also allowed U.S. producers to become more productive by expanding the variety of key inputs available to them. And new communications technologies have further enabled trade and investment to thrive.

In sum, it is the combination of high performance and the rapid pace of innovation that are the key features of the New Economy. Based on this view, we define the New Economy by the extraordinary gains in performance, including rapid productivity, rising incomes, low unemployment, and moderate inflation, which have resulted from a combination of mutually reinforcing advances in technologies, business strategies and economic policies.

The rest of this chapter elaborates on the nature and some of the implications of the New Economy. First, it documents the roles of technological innovation and investment in raising productivity growth both within the information technology sector and in the rest of the

economy. Then it moves behind the aggregate data to describe how new technologies, new organizational innovation, and new policies have produced these results. Finally, it appraises the implications for public policy.

America can be gratified by the achievements of the past 8 years. But there is no room for complacency. The good economy has been rolling so long now that there is a danger of taking growth for granted. There are good reasons to expect that the long-run trend rate of productivity growth has increased relative to the post-1973 trend, and the new technologies do not appear to have exhausted their potential. But it is possible, indeed likely, that there will be somewhat slower growth going forward than the rate achieved over the past few years. The economic forecast described in Chapter 2 below, is optimistic, but is also cautious about the future.

Moreover, it would be a grave error to assume that the economy has been so transformed that the basic rules of economics no longer apply. There is the potential for faster growth, but demand cannot run ahead of supply without the danger of rising inflation. The economy remains susceptible to cyclical fluctuations. Indeed, the rewards of the New Economy are also associated with greater risks, since the economy has become more heavily dependent on financial markets, and these continue to be volatile.

It would also be a mistake to abandon the policies that have transformed the economy. While the current prosperity certainly reflects the efforts of Americans in the private sector, it would be wrong – and dangerous – to ignore the contribution of public policy. In particular, it

would be risky to abandon the policies that have helped us move from huge budget deficits into large surpluses and have laid the groundwork for the capital formation that has been so important in stimulating growth. Similarly, it would be dangerous to undermine the policies that have supported investments in the people and technologies that are the keys to advancing productivity. It would also be folly to abandon the efforts to make markets at home and abroad more competitive, since it is this competition that has created an environment in which entrepreneurs can flourish and America can benefit from the globalization of the economy. And finally, it would wrong for the government not to ensure that prosperity is more widely shared, since this is something the private sector will not automatically accomplish. A strong economy, even the extraordinary economy of the past 8 years, does not solve all problems and does not guarantee that everyone is better off. Over the past 8 years important steps have been taken to spread the benefits of economic growth to disadvantaged regions and families. But much remains to be done. And resources are indeed available to tackle the problems of Americans without health insurance, of schools without adequate school buildings, and of a Social Security system without adequate actuarial reserves for the long term.

Information Technology and the New Economy

Spending on IT has clearly played a leading role in the acceleration of economic growth. Although the sector remains a fairly small part of the economy – its share was just 8.3 percent of overall output GDP in 2000 – it has accounted for almost a third of output growth between 1995 and 1999 (Chart 3). Similarly, investment in information processing equipment and software as a share of all private non-residential fixed investment has increased from 13.8 percent in 1993 to 41.5 percent in the third quarter of 2000. It is also clear that there has been a surge in innovation

within the IT sector. To be sure, the computer, the cell phone, optical fibers, lasers, and the Internet were all available prior to the mid-1990s, but over the course of the decade, a series of breakthroughs in computer hardware and software and telecommunications has allowed for complementary interactions of unprecedented scale.. The most dramatic example of these interactions is, of course, the Internet.

CHART 3 HERE

It is not surprising that there is consensus that IT has been important in recent economic performance. But the role of developments beyond IT remains more controversial. Some have adopted a narrow perspective and identified the New Economy with the production and use of IT. Some proponents of this view argue either that performance in the rest of the economy has simply followed previous trends, or that it has only been boosted temporarily with recent strong economic growth.

While we agree that the innovation and diffusion of IT is important, we believe that a broader definition of the New Economy more accurately conveys the pervasive nature of the changes that have occurred throughout the U.S. economy in recent years. There is now considerable evidence that the widespread application of IT, however, has also stimulated changes within firms and other institutions throughout the economy. And in addition to the effects of IT, there has been a surge in innovation elsewhere. Together with supportive public policies, these changes have created a fundamentally transformed economy. An examination of recent productivity growth provides support for this view.

The New Trend in Productivity Growth

Productivity is now growing much faster than the sluggish trend it had achieved over the twenty years since 1973 (Chart 4, where productivity is measured by output per hour in the non-farm business sector of the economy). What can be said about the sources of this acceleration?

Using a standard economic model of growth, it is possible to make estimates of what has contributed to this acceleration of U.S. productivity growth. Table 1 shows that output per hour in the non-farm business sector accelerated from a trend rate of growth of 1.39 percent a year prior to 1995 up to 2.95 percent since then – 1.56 percentage points of acceleration. This acceleration can be broken down into four sources: (a) the contribution coming directly from the industries making the IT hardware and software; (b) the contribution coming from the growth in the amount of capital per worker-hour throughout the economy; (c) the contribution coming from changes in the measurable skills of the workforce; and (d) the acceleration of productivity outside the computer hardware and software sector, not directly attributable to any of these other sources.

CHART 4 AND TABLE 1 HERE

Taking account of the machines' improved performance, computer prices have been falling for a long time. Starting in the mid-1990s, however, these prices fell even more rapidly, reflecting primarily an increase in the rate of growth of total factor productivity (TFP) within the computer-producing sector. Using the more rapid rate of price decline as a guide, we estimate

that 0.18 percent of the productivity acceleration, or 11.5 percent of the total, comes from the production of computers. See Table 1.

DATA IN TABLE 1 AND IN THE TEXT ARE CURRENTLY BEING REVISED AND UPDATED.

Investment has been extremely strong during this expansion, and particularly after 1995, investment in computers and software has responded markedly to robust growth, low real interest rates, a strong stock market and rapidly falling prices of computers. As Table 1 shows, computers and software added 0.86 percent to the increase in labor productivity growth after 1995, or 57 percent of the total. Since the rate of investment in capital goods other than computer hardware and software slowed slightly after 1995, the contribution of capital deepening (the increase in capital per worker) in total to the increased productivity growth was 0.47 percent, or 31 percent of the total.

The Bureau of Labor Statistics measures "labor quality," based on the age, education, and experience of the workforce. Using statistical methods, they determine differences in earnings paid to workers with different characteristics, and infer that these relative wage differences reflect relative productivity differences. Labor quality, measured in this way, has steadily increased over time as education and skills have increased. Because the increase has been steady, however, the contribution of labor quality to the productivity acceleration has been negligible.

The final contribution to the productivity acceleration comes from "other TFP." This is calculated as a residual, and it captures the extent to which technological change and other

business and workplace improvements outside the computer sector have made greater contributions to productivity growth since 1995. This factor accounts for 1.03 percent of the productivity acceleration, or 66 percent of the total. Clearly, improvements within the IT sector aside, much of the recent acceleration in productivity is due to improvements in the way capital is used, rather than increases in the stock of capital itself.

This contribution to the productivity surge coming from outside the computer sector (the other TFP category) is calculated as a residual. This means that temporary or short-term effects are lumped together with more long-term structural effects. One leading issue, therefore, is the extent to which the acceleration is the result of purely cyclical effects, rather than the impact of innovation. There is no foolproof way to separate cyclical and structural components; hence, there is no way to be certain how much of the new productivity trend will survive the ups and downs of future business cycles. However, the increase in growth since 1995 is noteworthy in that it occurred in an economy that already had a high rate of utilization of its resources in 1995. Historically, sharp increases in productivity have occurred in economies recovering from recessions. Chart 4 displays prior periods in which productivity fell below trend during recession years like 1981-82, and then a year or so of rapid growth pushed it back to or a little above trend, before the series fell back to its trend again soon thereafter. Our recent performance appears much more like a new technological wave, which gathers strength over time, than a conventional cyclical response, which peters out as the expansion progresses.

Our own statistical estimates support this view, suggesting that none of the post-1995 productivity acceleration is cyclical. Based on historical patterns, the cyclical boost to

productivity growth occurred earlier in the cycle, not after 1995. The *level* of productivity 1995-2000 is above trend, but the *growth rate* is not.

This decomposition of the productivity acceleration, therefore, provides three important lessons:

- *First, the IT sector has provided a major boost to productivity.* A modest part of this has come from the direct effect of productivity growth within the IT sector – notably the production of computers.

- *Second, innovations, new business systems and new skills are boosting productivity growth outside the computer sector.* Additional TFP growth surely comes from a variety of changes that go beyond the direct use of computers (although many of the innovations were likely facilitated by the new information and communications technologies).

- *Third, a major contribution has come from the use of the computers (the capital deepening) throughout the economy.* Companies have been eager and able to buy computers of a given capability at much lower prices over time, or buy much more powerful computers at the same price. This, together with favorable economic conditions, has fueled a computer and software investment boom.

What accounts for the changes revealed in this productivity analysis? Answering this question requires moving behind the aggregate numbers to consider three sets of complementary

developments. First, changes within the sector creating IT; second, changes in the sectors using IT; and third, change in economic policy.

Innovations in the Information Technology Sector

Dramatic developments have occurred within the IT sector – particularly in the second half of the decade, in which the pace of innovation appears to have accelerated (Chart 5). In Panel 1 the chart shows the surge in R&D spending on IT, and Panel 2 indicates the heightened pace of innovation as measured by patents. Panel 3 depicts the surge in the production of computers, semiconductors, and communications equipment: between 1992 and 2000, the volume of IT production increased more than thirteenfold! Finally, Panel 4 shows the rapid increase in employment in the sectors providing computer and data processing services. Clearly, the IT sector has been astoundingly dynamic.

CHART 5 HERE

Over the course of the past decade, the system for creating new information technologies has undergone a host of major developments, transforming many aspects of the way innovation occurs. In the past, defense spending was a major driver of innovation, the Federal budget was a relatively more important source of R&D funding, most innovation was undertaken predominantly by large corporations within manufacturing, and competition in the U.S. markets involved mainly U.S. firms. But today there are many differences that are detailed in Chapter 3 of this report. Here, four important developments deserve mention:

New Competition. The IT sector is being driven by heightened competition in an economy in which deregulation and international competition play an ever-increasing role. With the end of the Cold War, the private sector now dominates a more global U.S. economy. These competitive pressures enhance both the creation and adoption of new technologies. When new or existing rivals bring innovations to market, existing firms are given strong incentives to innovate. In the IT area, the advantage of setting the standard often goes to the firm that is first to market. This again puts a high premium on rapid innovation. Of course, in order to have strong financial incentives for innovation, there must be a strong demand for the resulting IT products and services coming from the companies that will use the new technologies. Almost XX percent of all IT products are purchased by wholesale and retail trade, finance, and telecommunications sectors. The existence of competition, often global competition, within these industries encourages them to seek out new technologies to improve their own productivity. Unlike some other countries, competitive pressures are particularly strong in these sectors in the US, as firms in wholesale and retail trade are prevented from adopting retail price maintenance and other restraints on competition. Deregulation has played a key role in finance and telecommunications.

The incentives and the opportunity to innovate are shown dramatically by the increase in the number of new firms in the IT sector. Between 1990 and 1997 the number of IT firms has more than doubled—a 140% increase (Chart 6). Many innovations have come from small start-up companies where talented individuals are willing to take risks.

CHART 6 HERE

New Organization. Competitive pressures have thus increased the importance of speed in introducing new products and processes. Yet the knowledge required for innovation has become increasingly complicated, in part because it often requires more scientific knowledge – witness the dramatic increase in basic research spending undertaken by private firms. Taken together, this means that a single firm can rarely make all the breakthroughs on its own. In response, therefore, the organization of innovation has changed. Relatively less R&D now takes place within large integrated companies. Increasingly the process of innovation has become more diffuse and takes place across communities such as Silicon Valley rather than within individual firms. Networking among firms and researchers has become common, facilitated by breakthroughs in software, which have allowed innovation to be modularized by improving communications among innovators. More innovation is undertaken in small and new firms, free of the more conservative constraints often imposed in large firms.

New Complementarities. The changes in the IT sector have been cumulative and complementary. Innovations in one area create demands in another. Breakthroughs providing better hardware allow for better software; breakthroughs in communications systems create a demand for better communications software. Complementarities are operating on both the supply and demand sides. In particular, the low cost of computing power has made certain types of research feasible. For example, the mapping of the human genome has only been possible because of computers. Furthermore, computer-aided design is increasingly important in the development of new drugs, and the FDA uses computer-generated data sets to speed their subsequent analysis and approval. Demand is particularly powerful when it generates positive

feedback through network effects. E-mail for example becomes increasingly useful, as more people become users of it.

New Compensation and Finance. Traditional lending is secured by using plant and equipment as collateral, but new institutional arrangements have been required to deal with the unique challenges of promoting innovations in sectors in which much of the know-how is based on intangible capital and the risks are particularly great. Venture capital in particular has played a crucial role, in supplying funds and in providing management know-how and connections for inexperienced entrepreneurs. The ability to launch initial public offerings (IPOs) has also played a key role. The IT sector has developed, making extensive use of new mechanisms providing incentives to talented workers and managers. For example, using stock options enables firms to attract and retain talent and have workers bear some of the risks. A vibrant stock market has been important, allowing venture capitalists to cash out through IPOs and enabling holders of options to boost their earnings. There is also an important sense in which success has generated additional success, as venture capitalists score big and then use the capital to seek out new profitable opportunities.

In sum, the evidence suggests that the combination of increased demand for technology, spurred by intense domestic and global competition and technological complementarities, improved capacity to supply new technologies by reorganized firms and networks, and innovations in thriving financial markets have created a uniquely favorable climate for entrepreneurism.

CHART 7 HERE

New Relationships with Customers. Information technologies provide firms with the ability to have much richer and more targeted relationships with their customers. Firms are able to tailor marketing and product design more precisely to customer needs. Customers, in turn, are able to find products that match their preferences more closely.

New Corporate Boundaries. Markets allocate resources efficiently by setting prices, expanding choice, and encouraging competition. Where pricing and writing contracts is costly and difficult, however, uncertainty high, and information difficult to come by, activities may be more efficiently undertaken within the firm. Transaction costs will thus affect the make-or-buy decisions, which determine where the firm's boundaries end, and the market begins. Information technologies can radically change where these boundaries should be drawn, setting in motion both centrifugal and centripetal forces. On the one hand, there have been a large number of mergers, some motivated by firms that believe that technology allows the span of organization to be extended. As indicated in Chart 8, both the number and the value of mergers and acquisitions have moved to new heights as firms seek to capitalize on both efficiency and market power gains. On the other hand, we see a greater role for small firms that concentrate on and specialize in a few core activities.

CHART 8 HERE

Behind the New Trends: The Role of Policy

The policy strategy adopted by the Administration complemented and fostered the private sector initiatives that generated these new trends. The approach has rested on three major pillars: fiscal discipline, investing in people and technologies, and opening markets at home and abroad. Each of these policy emphases has contributed to the economic environment in which the New Economy has thrived. They have contributed to an economy in which innovative new businesses have been stimulated by relatively low interest rates, an abundant supply of risk capital, world-class educational and research institutions, a well educated and trained workforce, competitive product and labor markets, and policies which have facilitated the development and diffusion of the Internet.

Fiscal Discipline. The Omnibus Budget and Reconciliation Act of 1993 was the right policy package at the right time. The Federal Funds rate had been held at 3 percent, close to the rate of inflation for X months, in order to get the economy moving and to generate jobs. But long-term interest rates remained stubbornly high, with the 10-year Treasury bond rate averaging 7.0 percent in 1992, surprisingly high in a weak economy. Bond yields were being affected predictably by the forces of supply and demand. The Federal Government was set to run a deficit of about $300 billion, adding a massive new increment to the already swollen stock of outstanding debt. With an oversupply of Government bonds and the prospect of even more supply to come, the price of bonds was depressed, and yields were correspondingly high.

President Clinton and Vice President Gore had been elected after promising to turn the deficits around. They were able to deliver on that promise, after a tough political battle. The

1980s reduction in tax rates for those in the upper tail of the income distribution, were partially rolled back. Spending was restrained, using the opportunity to reduce military spending offered by the end of the Cold War. Markets quickly responded to this serious effort to address the deficit problem by lowering expectations of future inflation and thus long-term interest rates. The 10-year rate hit a low of 5.3 percent in October 1993. Over the next year or so, the combination of a stronger economy and the decision by the Federal Reserve to boost short-term rates resulted in some upward movement of long-term rates again. But as the economic growth and restraints on spending (including the bipartisan 1997 budget agreement) turned the huge deficits into surpluses, a new fiscal environment emerged. The 10-year rate fell below 6 percent in 1998 and 1999. And despite the extraordinarily strong economy and associated upward movement in short-term rates, the 10-year rate was at only 5.6 percent in November 2000. The budget surplus for fiscal year 2000 is $237 billion, 2.4 percent of GDP, the highest share since 1948, and a swing of $527 billion over 7 years to the largest surplus since 1948, both in real terms and as a percent of GDP. As Chart 9 shows, real interest rates in the 1990s were lower than they had been in the 1980s. The improved budget situation in the 1990s held down real rates despite an economy that was booming.

CHART 9 HERE

Chart 10 shows budget deficits and surpluses by fiscal year from 1970 to 2000. The ups and downs caused by the business cycle are visible in the data. But even clearer cut is the trend that existed prior to 1993 and the sharp turnaround after that. Both fueling and capitalizing on

the economic potential for rapid growth provided by the private sector, the right policies were followed.

CHART 10 HERE

The most direct link between improved fiscal discipline and growth is that low interest rates encourage investment, as financing becomes less costly. In addition, low interest rates contribute to a strong stock market, allowing both old and new companies to lower their cost of capital. So the combination of falling prices of investment goods and a lower interest cost of capital stimulated the dramatic growth in investment. Led by purchases of equipment and software, investment grew at 13 percent a year from the first quarter of 1993 to the third quarter of 2000. Investment is not the only contributor to growth, but the new technologies cannot be acquired without it. Strong investment is essential for rapid growth, and by reducing the amount of savings going towards public debt, fiscal discipline has made room for strong investment.

There has been a virtuous circle, in which the right policy in 1993 kicked off a chain of smaller deficits, lower costs of capital, higher investment, more new technology in the workplace, and increasing economic growth. This then turned the deficit into a surplus and kept the virtuous circle turning.

Investing in People and Technology. If fiscal discipline had been implemented by cutting back on investment in education, training, and technology development, it would have been a failure, or would certainly have undermined the potential for long-term growth. The

Administration did not do this. Instead, its budget proposals consistently pushed for increased spending for these growth-oriented programs. And despite the fact that not all the requests were approved in the final budgets, there were substantial funding increases in these areas.

TO BE ADDED: more on rise in R&D and education programs, mentioning public research institutions, such as NSF (which sponsors basic research) and NIH. Discussion of DOL programs related to investing in people such as boosting worker skills.

Setting the Rules for Fair and Open Competition. Companies that compete against the best companies in the world are more likely to adopt best practices themselves. Globalization has played an important role in encouraging higher productivity among U.S. companies, in bringing business practices from around the world into the United States, and by giving U.S. companies the opportunity to take their own best technologies or best practices overseas with exports and investment. Globalization has also increased price competition, helping to keep inflation down.

Globalization has also been particularly important in promoting the competitive pressures that have made the U.S. economy so innovative. In addition, globalization has played a key role in enhancing the production and adoption of information technologies in the United States. By exporting to global markets, U.S. innovators achieve greater scale economies that can increase the returns to research and development. By being combined with key components produced most cheaply abroad, the value-added by U.S.-based producers can be turned into products that are internationally competitive. The importance of such global linkages for the

computer industry is vividly indicated in Chart 11, which shows that in 1999 imports accounted for fully 60 percent of U.S. domestic spending on computers, while about 50 percent of domestically produced computers were exported.

CHART 11 HERE

While reductions in communications and transportation costs have contributed to globalization, policy has also played an important role. The agenda for the expansion of world trade and investment has been a bipartisan one, with agreements negotiated over long periods with different Administrations. It is vital that these agreements are ratified and implemented, however, and that has often been difficult. Over the past 8 years, the Administration has sustained this agenda, and a series of important international agreements have been signed or ratified. These include the North American Free Trade Agreement (NAFTA); the Uruguay round setting up the World Trade Organization (WTO); the Multilateral Agreements on Trade in Financial Services; Basic Telecom and Information Technology; the moratorium on tariffs on digitally delivered goods and the agreement with China that has paved the way for its entry into the WTO. This is an extraordinary record of achievement, which has paid off in improved economic performance in the short run and will contribute to continued growth ahead.

THIS SECTION IS SUBJECT TO REVISION IN THE LIGHT OF AGENCY COMMENTS.

The vast U.S. market provides a competitive environment in most industries, even absent foreign trade. The existence of this large national market has been one of the great strengths of the U.S. economy over the years. But competition can be threatened if a single company abuses

its dominance in a market. U.S. antitrust laws do not discourage successful companies from growing and gaining market share by superior products and services. Rather, these laws restrict companies that seek, through mergers and acquisitions, to obtain a market position that would threaten competition in an industry. They restrict corporate conduct that undermines competition and consequently harms consumers. Indeed, the ultimate goal of antitrust is to protect the interests of the consumers.

Each proposed merger presents new challenges to antitrust officials. To the extent that it may enhance consumer benefits through efficiency gains and competition, and contribute to lower consumer prices and greater consumer choice, the result is positive. To the degree that it may restrict competition and prevent small upcoming companies from competing and growing, the result is negative. Antitrust officials must weigh these and other opposing effects in evaluating mergers and acquisitions, and examining competition issues. The new information economy particularly presents new challenges in this area. The growth of the information economy, in which operating at large-scale saves costs, has increased the challenge. But the fact that there is a significant challenge involved in how to apply the laws is not a reason to forget them. Markets work better when consumers have choices and where small upcoming companies have the opportunity to compete and grow. Competition policy helps provide those choices and opportunities.

Regulatory policies, which promote competition, have also been important. The regulatory reform movement has been bipartisan, starting in the 1970s and continuing in the 1980s. Important new steps of regulatory reform have been taken in the 1990s, steps that have

been carefully considered and again agreed to on a bipartisan basis. The 1996 Telecommunications Act and spectrum auctions have allowed new competitors to compete against existing telecom providers and expand dramatically the availability of wireless service to consumers. This industry has exploded with new investment and new services. And with third generation wireless service on the horizon, it is vital that the progress not slow down.

In financial services, the Glass-Steagall provisions instituted in the 1930s prevented banks from joining with stockbrokers and insurance companies. Restrictions on interstate banking prevented bankers from straying too far from the geographic areas they knew well. Given the massive financial instability of the 1930s, it was arguably important to narrow the range of activities that banks could follow. Those rules are not needed today, and the easing of interstate banking rules, along with the passage of the Financial Modernization Act, have removed them, while maintaining appropriate safeguards. These steps are allowing consolidation in the financial sector that provides efficiency gains and new services for consumers.

Social Policies. As shown earlier, the stunning economic performance over the past 8 years has reached down to provide sharp reductions in poverty and across-the-board improvements in income. An important reason for this is that the expansion has brought a high-employment economy that has provided economic opportunities for disadvantaged workers or those who have not yet acquired adequate marketable skills. In a tight labor market employers hire and train workers they might previously have passed over. But beyond this, specific policies have expanded opportunity.

The Earned Income Tax Credit (EITC) program increases the payoff to work. Since 1993 there have been increases in both benefits and in the scope of coverage. In 1999 $32 billion was paid to beneficiaries, compared to $18 billion in 1993, and the number of families receiving assistance increased by one-third, from 15 million to nearly 20 million. Operating in tandem with the EITC is the minimum wage. Were an additional increase of $1 in the minimum wage passed this year (as the Administration has proposed) and combined with a possible 40 percent EITC subsidy, many low-wage workers would receive an effective wage minimum of $7.21 per hour of work (although the cost to employers is much lower). Welfare reform has encouraged families to find a way to become self-sufficient and has supported them as they make the transition. Empowerment Zone and Enterprise Community programs and the New Markets initiative would help spread prosperity to regions that have been left behind by economic growth by providing funds for growth initiatives and tax incentives for job creation.

Some people suggest restrictions should be imposed on the labor market that would limit its efficiency in order to achieve social goals. Others have suggested that any government programs that help the disadvantaged will reduce incentives and discourage economic growth. They would claim that only a laissez-faire market is compatible with the adjustment necessary to achieve strong performance. But the EITC, Welfare Reform, adjustment assistance, and support for life-long learning all suggest that these views are wrong. They show how it is possible to design policies to aid the disadvantaged or to assist those facing change, while at the same time maintaining a labor market that provides incentives for work and change.

Implications of the New Economy

Economic performance has been so strong and so different from the prior two decades that claiming there is "New Economy" may seem obvious. When productivity growth and GDP growth sharply accelerate. When unemployment and inflation are the lowest since the 1960s. When poverty starts to fall again after years of trend deterioration. When incomes increase across-the-board, it is evident that significant change has occurred.

In addition, the economic transformations we have described point to a New Economy. IT has become a pervasive part of economic life, changing the way we work, whether we are "knowledge workers" as such or farmers using the Internet to check soil moisture by satellite report. Computers have been around and facilitating business system change for a long time. But the explosive growth in IT in recent years, occurring in both its production and its use, has impacted the total economy dramatically. The innovation that has taken place, both within the IT sector and throughout the rest of the economy, has been accompanied by complementary developments in organization, business strategies, and public policies.

But the "New Economy" label can be misused. It does not mean the lessons of economic history can be discarded, and it does not mean that concern for the elderly or the disadvantaged can be forgotten.

Maintaining Low Inflation. The New Economy does not mean we can ignore the danger of inflationary pressure. An important goal of economic policy in this Administration has been low and stable inflation. Respecting the independence of the Federal Reserve has been an

CHAPTER 2
Macroeconomic Policy and Performance

The United States achieved record-breaking growth last year. In February the length of the expansion reached 107 months since the last business cycle trough in March 1991, eclipsing the previous record of 106 months set in the 1960s. Perhaps even more remarkable than the length of the expansion has been its strength. Driven by vigorous investment and accelerating productivity, real GDP grew a torrid 6 percent between the second quarter of 1999 and the second quarter of 2000, yet core inflation remained tame. It is probably not surprising that growth moderated in the second half of the year after such a surge, but the unemployment rate in November remained a relatively low 4.x percent. Strong and rising productivity growth well into an expansion and the prolonged coexistence of low unemployment and low inflation are features of the macroeconomy that have not been seen together before and justify the term "new." But to accept that we are in a New Economy characterized by strong productivity growth and a high rate of investment in technology is not to conclude that the business cycle has been banished and there are no risks on the horizon. Oil prices have increased sharply in the past 2 years, for example, and oil price shocks were associated with the onset of a recession twice in the 1970s and again in 1990. But the fundamental soundness of today's economy augurs well for our ability to weather the oil price storm just as we weathered the turmoil of the Asian financial crisis in 1997-98. Indeed, the U.S. economy appears to be at a unique point in its modern post-World War II history, reaping the benefits of sound policies and a rich technological environment.

This chapter describes the fruits of these policies and technological developments in the recent performance of the economy. But it also looks to the future. In particular, it discusses the importance of preserving the fiscal discipline that has provided a policy environment conducive to investment and the strong performance of recent years. It also looks forward to the new issues for macroeconomic policy that would arise if we enter a world where the national debt has been paid down and the Federal government is a net creditor.

The chapter begins with a review of the year's macroeconomic developments. As in the past few years, the review identifies several positive indicators of a New Economy, such as high investment rates, strong productivity growth, and low unemployment with stable core inflation. But it also notes two less sanguine indicators: a low and falling private saving rate and a widening current account deficit. Although it could be a problem if either of these were to persist, each appears, in the short run at least, to be a side-effect of the economy's new features rather than an indicator of poor performance. Low private saving, as measured in the standard national income accounts, has been accompanied by large increases in wealth that are not part of saving as conventionally measured. In large part these increases in wealth reflect investor optimism about prospects for continued rapid growth in profits. Similarly, the widening current account deficit may well reflect not only our own low private saving out of current income but also, as discussed in Chapter 4, the attractiveness to foreigners of investing in the United States.

While evidence that there is something new about the economy is widespread, considerable uncertainty remains about how dramatically the basic parameters of macroeconomic performance have changed. Productivity growth has certainly been strong

recently. But precisely how much of the recent increase in productivity growth is cyclical, and how much represents an improved long-term trend? The economy has been able to achieve remarkably low unemployment rates without rising inflation. But what is the longer-term sustainable rate of unemployment consistent with stable inflation? Recently, New Economy developments have led forecasters regularly to revise upward their short-term forecasts. But does this mean that the approach used to make these forecasts was wrong? The discussion of the Administration's forecast and the short-term economic outlook addresses these questions and the problems the New Economy has posed for forecasters in general. Because the forecast plays such an important role in the budget process, this Administration has consistently been cautious about giving too much weight to recent deviations from longer-term trends. But if productivity continues to accelerate, such prudence could once more produce a forecast that turns out to be too conservative.

The second half of the chapter shifts the focus from the short-term performance of the economy to the long-term fiscal outlook. The remarkable turnaround in Federal government finances over the past 8 years has created a virtuous cycle in which fiscal prudence has helped keep interest rates attractive for investment, and strong, productive investment has generated a strong and growing economy with ever larger budget surpluses. As a result, the United States is on track to be free of public Federal debt in a little more than a decade. Even assuming that the economy continues to perform reasonably well, however, such an outcome is not guaranteed if we make unwise fiscal choices. As this chapter will document, demographic trends are pushing us toward a situation in the latter part of the century where expenditures will be growing faster than revenues and deficits could re-emerge. Maintaining fiscal discipline today is critical to

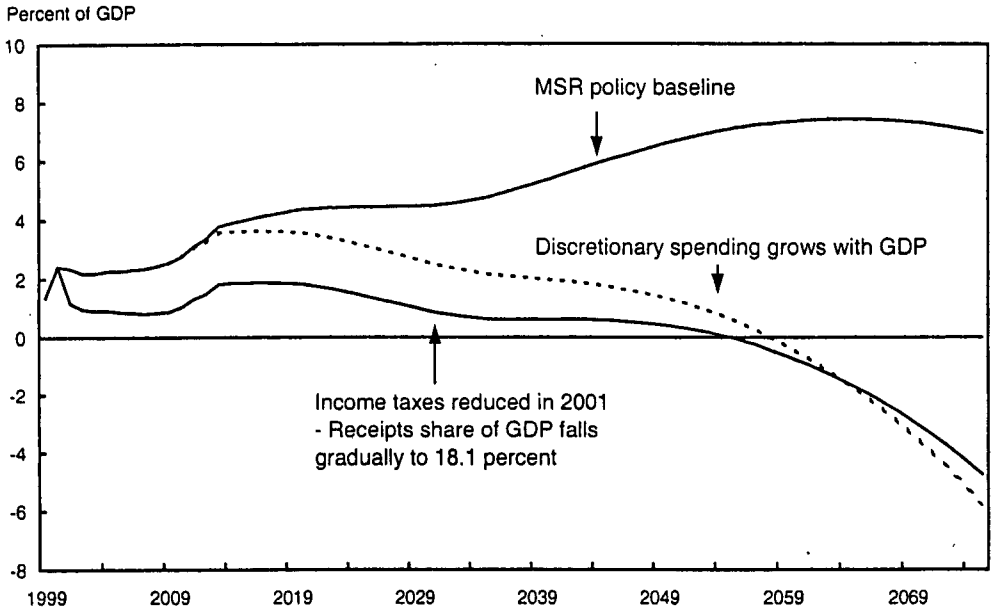
building up the resources and economic strength needed to address these demographic pressures down the road.

With the Federal debt scheduled to disappear and surpluses to continue for a long time thereafter, the Federal government would become a net creditor. Wise investment and management of the resulting "national asset" could thus play an important role in addressing the long-term demographic pressures, and this chapter provides an analysis of the challenges posed by these investment and management decisions. The disappearance of the Federal debt raises a number of other issues as well. For example, Federal government securities will no longer provide benchmark interest rates to the private sector. In addition, without an outstanding stock of Federal government securities, the Federal Reserve will have to change the mechanics of how it conducts monetary policy. Of course, the need to address these problems would never have even arisen in the Old Economy.

The Year in Review

After growing very rapidly between mid-1999 and mid-2000, the economy showed signs of moderating in the second half of 2000. Nevertheless, data for the full year, when they become available, are likely to show that 2000 was the fifth consecutive year in which growth exceeded 4 percent (chart 2-1). The pattern of spending in 2000 was similar to what it has been in the last few years (Table 2-1), with consumer expenditures growing faster than income, business investment in equipment and software growing robustly, and domestic spending outpacing domestic income to produce a large net exports deficit. With the economy operating at a very low level of unemployment, several measures of labor input showed little growth over the course

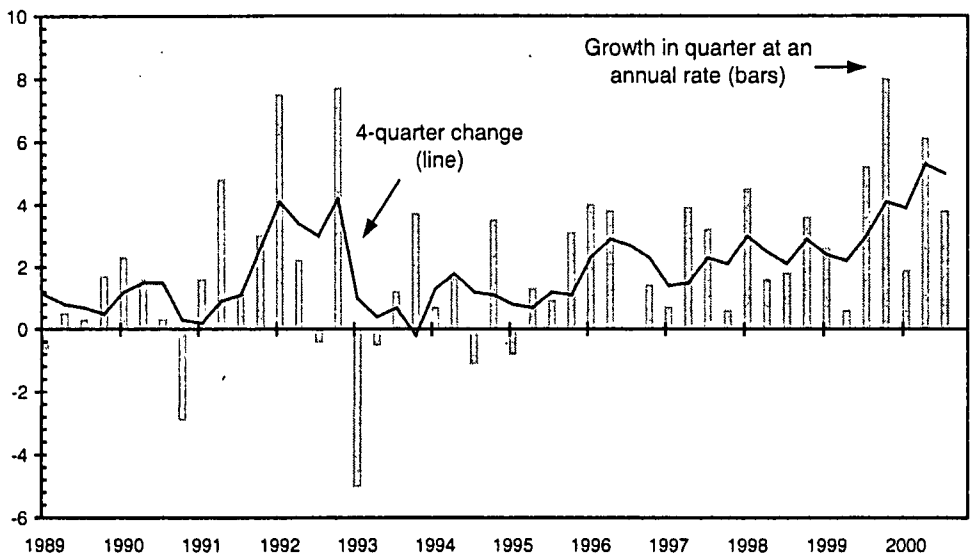
Chart 2- **75 Year Budget Projections Using Different Spending Assumptions**



Note:
Source:

Chart 2-2 **Productivity Has Accelerated in the Past Few Years and Growth in Productivity Exceeded 5 percent between mid-1999 and mid-2000.**

Growth in Output per Hour (Nonfarm Business Sector)
Percent change at annual rate



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

of the year, including payroll employment, hours worked, and the labor force participation rate. Nevertheless, growth continued to be strong because of surging labor productivity (chart 2-2).

Table 2-1--*Growth of Real GDP and Its Components During 1998-99 and 2000*

	Growth Rate		Contributions to growth	
	1998-99	2000	1998-99	2000
Gross domestic product	4.8	4.4	4.8	4.4
Final sales	4.7	4.4	4.7	4.4
Consumer expenditures	5.3	5.0	3.5	3.4
Residential investment	6.5	-1.7	0.3	-0.1
Business equipment and software	15.0	15.5	1.4	1.5
Business structures	1.6	9.1	0.0	0.3
Exports of goods and services	3.3	12.2	0.4	1.3
Imports of goods and services	11.6	14.8	-1.5	-2.0
Federal government consumption and gross investment	2.8	-3.3	0.2	-0.2
State and local government consumption and fixed investment	3.9	1.8	0.4	0.2
Change in inventories			0.1	0.0
Final sales to domestic purchasers	5.8	5.0	5.8	5.1
Net exports			-0.9	-0.7

Note: 1998-99 growth rates are from fourth quarter of 1997 to fourth quarter of 1999 at an annual rate; 2000 rates are from fourth quarter of 1999 to third quarter of 2000 at an annual rate.

Although rising energy prices contributed to increases in overall inflation, core inflation increased only modestly, despite continued tight labor markets.

In 2000, the economy had to negotiate several speed bumps. First, the very strong growth in the stock market that has fueled both consumer spending and investment in recent years came to a halt, though equity prices remain high by most measures. Technology stocks in general and Internet stocks in particular fell sharply after peaking in the spring and ended the year down from their 1999 close. This cooling off of the stock market most likely played a role in slowing the growth in consumer spending and business investment as the year progressed. Rising energy prices probably also played a role in slowing the economy as did increases in

[discussion of inventories]. How much of the variation in quarterly growth over the past 2 years has been due to inventories? Have they been stabilizing. Lean inventory-to-sales ratio.

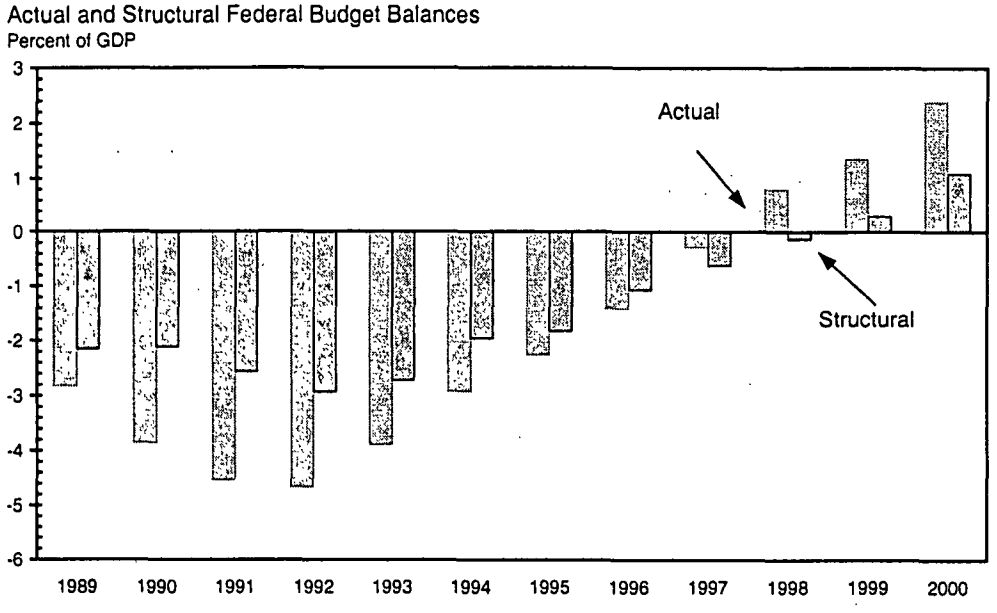
[some discussion of the financial condition of businesses focusing on the recent emergence of some concern about rising risk premiums and issues of financing. But basically the same argument as with households: these could be problems if the economy falters but they do appear to be the kind of imbalances that would precipitate a financial or economic crisis.]

Government Spending and Fiscal Policy

Government expenditures for consumption and investment, and particularly Federal government expenditures, have grown more slowly than GDP during this expansion. In the first three quarters of 2000, Federal government expenditures fell at a 3.3 percent annual rate. [more discussion of government spending of different types?].

One measure of whether fiscal policy is stimulative or restraining of economic activity is the change in the standardized or structural budget balance. In contrast to the actual budget balance, the structural balance controls for the effect of economic activity by estimating what receipts and outlays would be if the economy were operating at estimated potential output. After 1995, the structural deficit shrank, though not as fast as the actual deficit (Chart 2-6), indicating that fiscal policy was restrictive. The structural balance turned positive in 1999 and is estimated to have increased further in 2000 as the fiscal restraint has continued.

Chart 2-6 **The Structural Budget Deficit Shrank and Turned into a Surplus between 1995 and 2000, Indicating That Fiscal Policy Was Restrictive.**



Source: Office of Management and Budget.

International Influences

U.S. exports grew very strongly in 2000 as many of our trading partners continued to experience renewed economic growth. Nevertheless, the current account balance continued to widen and net exports continued to be a negative contributor to economic growth. As discussed

in Chapter 4, however, the widening of the trade and current account deficits in the past few years most likely are signs of the strength of the new American economy.

A country runs a current account deficit when its domestic spending exceeds its domestic income and it borrows abroad to fund that extra spending. Another way of saying the same thing is to say that a current account deficit reflects an excess of domestic investment over domestic saving, with the extra investment funded by borrowing abroad (drawing on the saving of foreigners). The wealth effects on consumption discussed previously have generated substantial consumption, some of which has been met through imports. Moreover, as discussed in Chapter 4, imports represent a significant share of U.S. investment, including communications and information technology investment. At the same time, investment in the new economy of the United States has been attractive to foreigners, which has helped keep demand for the dollar strong. These developments appear to reflect the strength of the U.S. economy and the importance of new developments like rapid wealth accumulation and attractive investment opportunities. Arguably, the U.S. economy is in a transitory phase in which national saving is held down by especially low private saving out of current income and by extraordinary investment opportunities in the United States, which is the frontrunner in making new economy investments.

Monetary Policy and Financial Markets

Monetary and financial market developments in 2000 were not particularly unusual for an economy experiencing a long expansion that had seen a period of extraordinary stock market

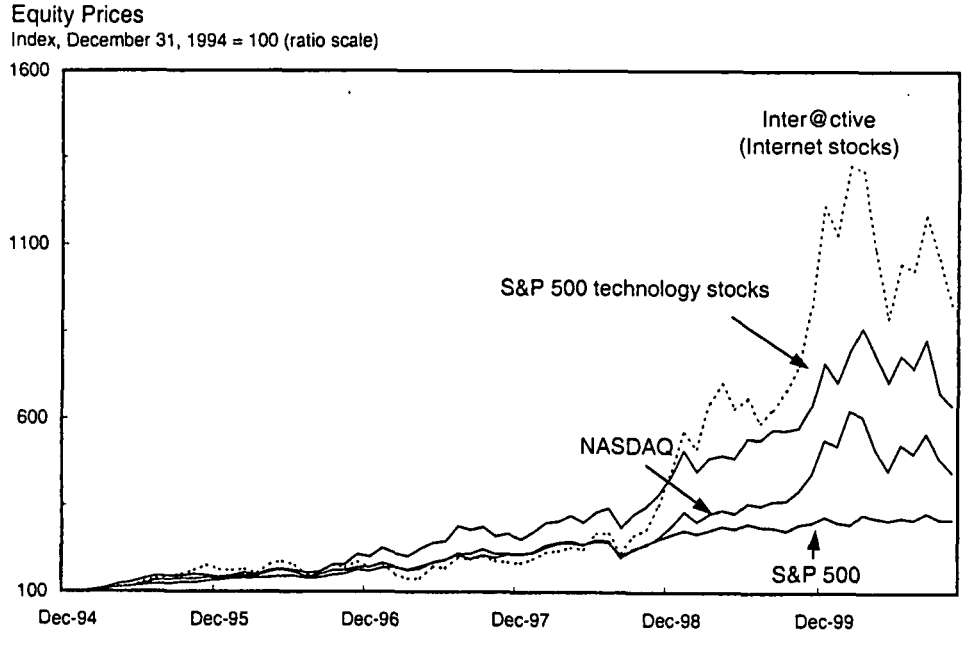
gains. The stock market took a breather last year, and credit conditions reflected the monetary restraint being exercised by the Fed.

Equity Markets

As discussed earlier, wealth generated by a booming stock market has been an important driver of economic growth in the past several years. During the 1990s the broad stock market (measured by the Wilshire 5000 index) grew an average of 14.7 percent per year, while total market capitalization grew more than 400 percent between 199x and the end of 1999. Much of this growth was concentrated in the technology sector, which has transformed declining costs in computer manufacturing and rapid innovation into robust growth and product development. The technology-heavy NASDAQ index grew an average of 23.6 percent per year over the decade, and the technology sector accounted for roughly half of the increase in S&P 500 capitalization from the end of 1995 through 1999. Growth in Internet stocks exploded in the late 1990s. The market capitalization of Internet companies (defined as those in the Wilshire 5000 Internet index, which tries to include all companies that derive a substantial fraction of their business from the Internet) increased from $0.2 trillion in December 1997 to $1.6 trillion in December 1999. These Internet stocks alone accounted for about 12 percent of the total increase in stock market wealth over this period.

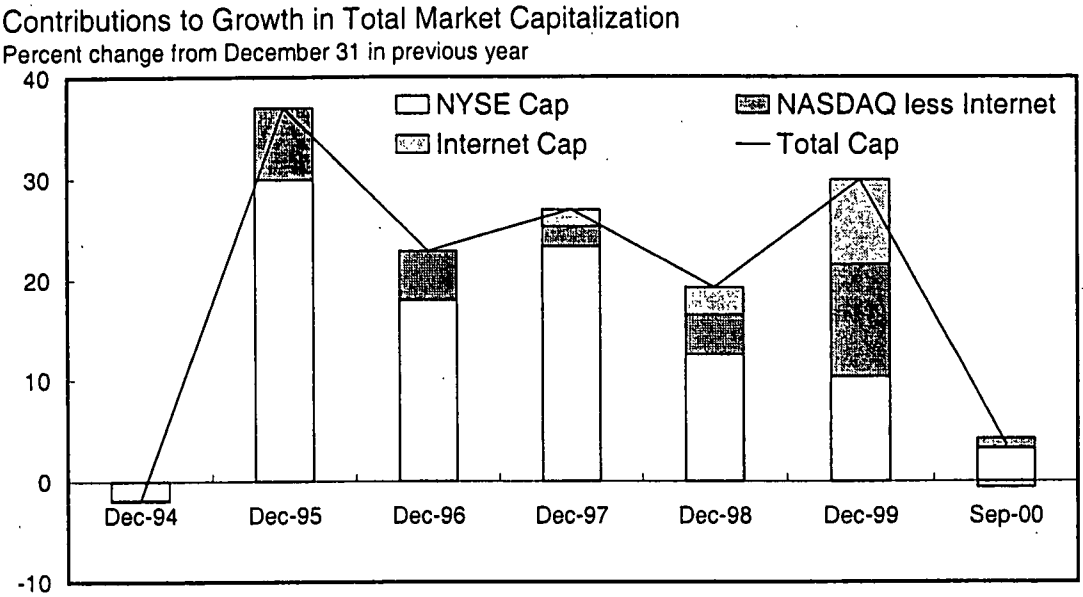
The sharp increase in stock prices came to a halt in 2000 (Chart 2-7). The S&P 500 index finished the year down [3 percent as of November 1], while the NASDAQ Index (after climbing 24 percent between January and March) fell sharply to end the year down [17 percent as of November 1]. Total stock market wealth increased only 2.8 percent {updated Sep. 30}, compared with an average annual increase of around 17½ percent over the past decade. Growth subsided in many of the sectors that have performed well in recent years. Internet stocks were particularly notable for their roller coaster ride in 2000. Market capitalization of Internet stocks declined 4½ percent over the year, and 23 percent from its high in March. Meanwhile, the total value of technology companies in the S&P 500 fell xx percent. This performance of technology stocks in general and Internet stocks in particular stands in marked contrast to 1999, when Internet stocks were a major source of growth in stock market wealth (Chart 2-8). continue to expand and offer new products at an impressive pace, growth in their equity prices may be

Chart 2-7 After Leading Stock-Market Growth In 1998-99, Internet and Technology Stocks Fell This Year; the Broader S&P 500 Index Was Flat.



Note:
Source:

Chart 2-8 **The Contribution of NASDAQ (Particularly Internet) Stocks to Overall Stock Market Capitalization was Negligible in 2000.**



converging to a pace more in line with that of the broader market.

The rational basis for stock market prices is the discounted present value of future cash flows (typically proxied by dividends), where the discount rate includes a risk factor. Thus, rational reasons for the tepid performance of the stock market last year are likely to be found in the factors affecting such a valuation. For example, a rise in interest rates reduces the present value of future cash flows. Increasing expectations that the economy would slow as a result of Federal Reserve tightening and other factors could also reduce expectations of future profits and hence cash flows. Disappointing earnings reports could also reduce expectations of future profitability. All of these factors seem to have been at work last year. High oil prices have also had an unfavorable impact on revenues, and profit expectations, particularly in energy-intensive industries such as transportation and basic materials. Finally, there is a possibility that the higher

growth potential technology companies have enjoyed, and continue to enjoy has already been priced into the market, as growth in this sector ceased to outperform the rest of the market. [how have earnings expectations changed?]

Interest Rates

Between June 1999 and July 2000 the Federal Reserve raised its target for the Federal funds rate (the rate banks charge each other for overnight lending) by 175 basis points, from 4.75 to 6.5 percent. In the second half of 1999, when the Fed began its rate hikes, both Treasury yields and corporate bond yields rose as the Federal funds rate rose. Yields on Treasury and other fixed-income securities of all maturities increased. Beginning in early 2000, however, the Treasury yield curve began to exhibit unusual behavior. Instead of its normal upward-sloping shape, the yield curve for Treasuries became inverted, with yields on longer-term securities falling below those on shorter term securities (Chart 2-9). This development appears to have been determined mostly by supply conditions in the market for Treasury securities associated with the Department's initiation of a debt buyback program. In the fall of 1999 the Treasury Department announced it would begin buying back Federal debt. By January 2000 yields on longer-tem Treasury's began to fall as investors anticipated a reduced supply of longer-term bonds. Over the year the Treasury bought back $yyy of Federal debt.

phillips curve fits the past 2 years data well without including a term for higher productivity growth). But this situation may not persist in the long run. The labor share of National income has eroded over the past few years. And wage-setting agreements may yet begin to ask for higher nominal wages consistent with the spectacular rise in productivity. As a result, the drop in the NAIRU to around 4 percent is not expected to persist. The Administration projection shows the unemployment rate edging up to 5. 1 percent during the next [ ]years.

The Stock Market and Saving

[another sketch]

Why is the saving rate so low and can it stay that way?

As discussed earlier, much of the decline in the personal saving rate is consistent with the enormous runup in the wealth-to-income ratio, which is largely a result of the rapid growth of stock market prices over the past several years.

The stock market could have increased either because of stronger dividend prospects or a decline in the equity risk premium

.

In any case the budget constraint implies that the present value of future consumption must equal the present value of future income. It follows that either consumption must grow more slowly than non-dividend income, or dividends much grow much faster than other forms of income—or some combination of these two.

It follows that the saving rate must rise over the long term.

Components of Long Term Growth

[Sketch awaiting completion of forecast]

As always, the growth of the supply-side components of GDP underlies the projection of long-term growth. In particular, the prospect for continued productivity growth is the key issue in the economic outlook and the source of many of the upside and downside risks to the Administration's projection.

Productivity

As discussed in chapter 1, it is reasonable to conclude that productivity growth since 1995 is outside the range of normal cyclical variation and stems from an increase in capital—especially computer and software capital—and productivity growth in the computer-producing sector. [whatever needs to be said here to amplify or repeat from chaper 1]

Fiscal Territory in the New Economy

The turnaround in the finances of the Federal government since 1993 has completely changed the fiscal outlook for decades into the future. Whereas the Nation just a few years ago faced deficits as far as the eye could see, the outlook now is for a substantial period of surpluses

that would wipe out the entire outstanding public debt of the Federal government if appropriate budget discipline is maintained. Instead of being a drain on the saving available to finance investment, the Federal government is providing an additional source of national saving that has until very recently more than offset the decline in private saving. A virtuous cycle has been created in which fiscal discipline has promoted strong economic growth and strong economic growth has increased the size of the surpluses.

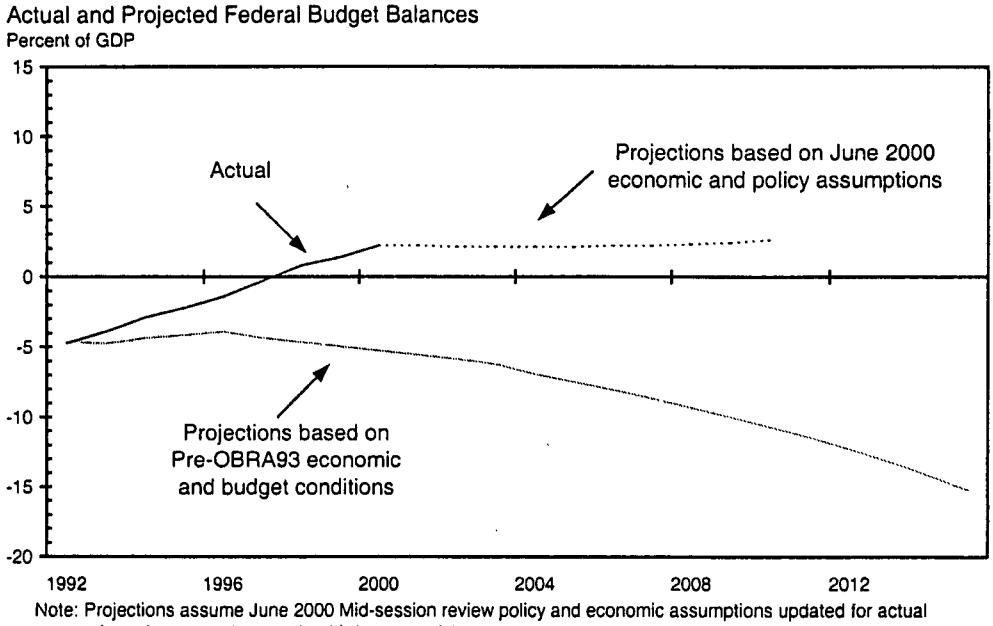
Challenges lie ahead, however, and it will be important to preserve the fiscal discipline that was so hard-won. In particular, the aging of the population will put downward pressure on the surpluses in the years ahead, as the number of Social Security and Medicare beneficiaries rises relative to the number of workers paying into the system. Prudent decisions today about what to do with currently projected surpluses will help sustain the present strength of the economy and address the fiscal policy issues raised by an aging population. Fiscal responsibility requires restraint in the overall level of tax cuts and new spending programs, so that the debt will continue to fall. It also calls for flexibility in our policy priorities, as the composition and hence the needs of our population change.

Strong Public Saving: the Payoff from Deficit Reduction

Large Federal budget deficits emerged in the 1980s, and despite deficit-reduction measures taken in the Omnibus Budget Reconciliation Act of 1990, the country faced a bleak budget outlook in 1993. But a succession of subsequent actions turned this situation around completely. The Omnibus Budget and Reconciliation Act of 1993 (OBRA93) reduced the deficit

through progressive changes in the income tax structure and effective constraints on spending; welfare reform legislation changed programs in ways that encouraged work and hence reduced spending needs; and the Balanced Budget Act of 1997 (BBA97) dramatically reduced real growth in Medicare expenses through effective rules on provider prices and payment systems. The difference between the pre-OBRA93 deficit path and the current situation is stunning. Where deficits were once projected to grow from 4.6 percent of GDP in 1992 to double-digit percentages by 2009, the current outlook is for surpluses in excess of 2 percent of GDP (Chart 2-12). The national debt, which had reached almost half of GDP in 1992 and was projected to be larger than GDP by 2009, has in fact begun to decline and is now projected to be eliminated by 2012 (Chart 2-13).

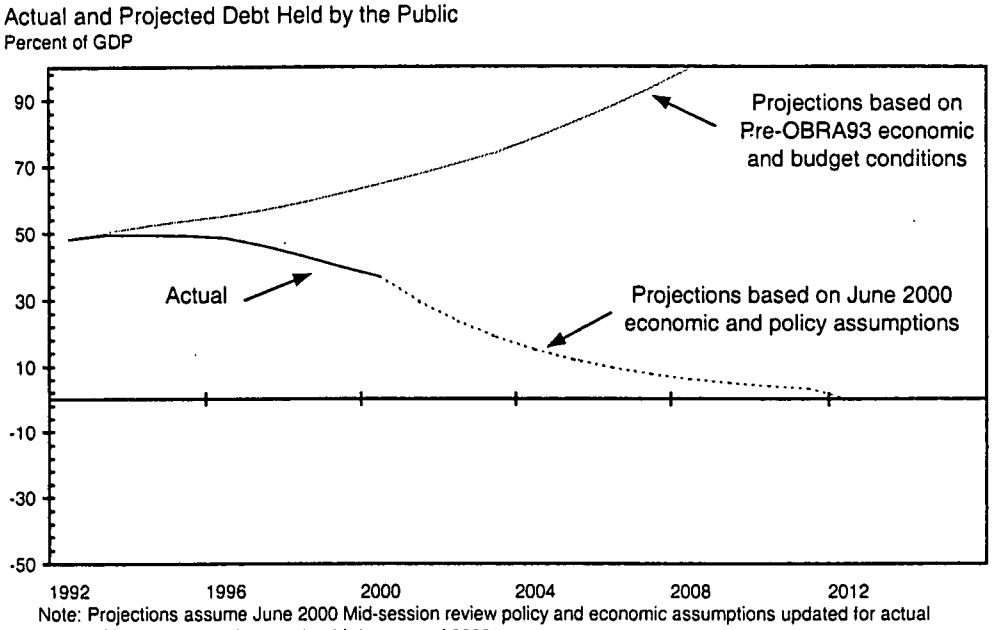
Chart 2-12 **Instead of the Exploding Deficits Projected under 1993 Condtions, the Budget Has Moved into Surplus**



Note: Projections assume June 2000 Mid-session review policy and economic assumptions updated for actual economic performance through the third quarter of 2000.
Source: Office of Management and Budget.

One very important consequence of this turnaround has been increased national saving. The large Federal budget deficits in the 1980s and early 1990s were a drain on the pool of

Chart 2-13 **Instead of Exploding as a Share of GDP, Federal Debt Held by the Public is Now Projected to Be Eliminated by 2012.**

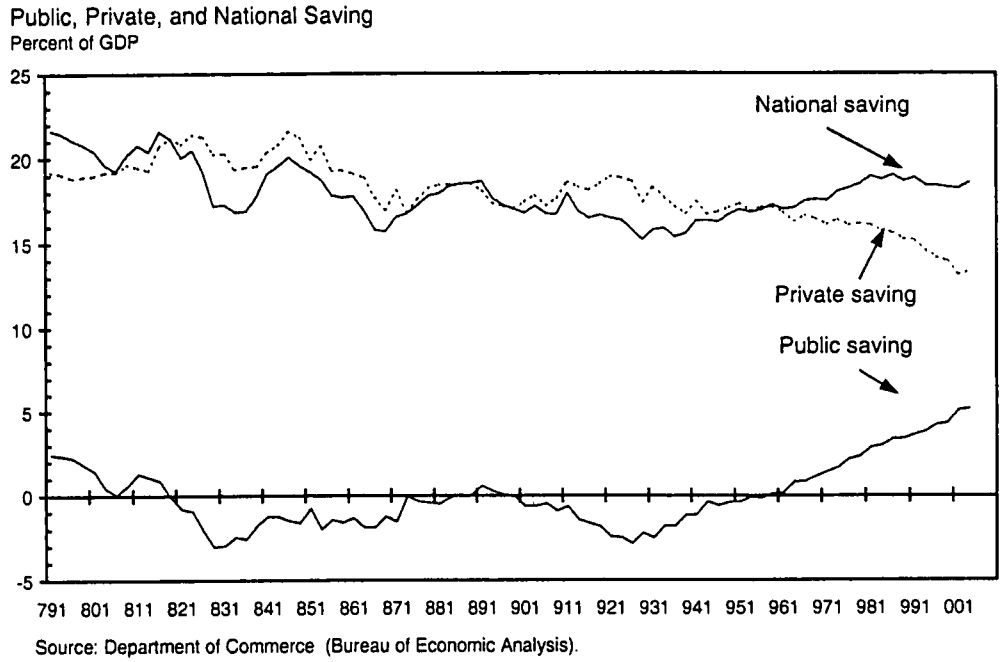


Note: Projections assume June 2000 Mid-session review policy and economic assumptions updated for actual economic performance through the third quarter of 2000.
Source: Office of Management and Budget.

national saving available for investment. The improvement in the Federal budget balance since 1993 has turned the public sector into a net saver. National saving (the sum of public and private saving) rose as a share of GDP in the 1990s (Chart 2-14). As discussed earlier, private saving has been particularly low recently, which has restrained national saving somewhat, and investment has grown even faster than saving, which has caused the current account deficit to increase. Nevertheless, without the improvement in the Federal budget balance since 1993, national saving would have been lower than it has been, interest rates would have been higher, and investment would have been constrained.

When the Federal government was running large budget deficits in the 1980s, the Federal Reserve's efforts to stabilize the economy in the face of this fiscal stimulus resulted in high interest rates. While fiscal stimulus can be helpful in propelling an economy out of a recession,

Chart 2-14 **The Turnaround in the Federal Budget Balance since 1993 Has Raised National Saving Despite a Decline in Private Saving**



Source: Department of Commerce (Bureau of Economic Analysis).

it is a source of inflationary pressure when the economy is close to full employment. Moreover, a mix of loose fiscal policy and tight monetary policy produces high interest rates that discourage investment. In the 1990s, by contrast, an improved Federal budget outlook allowed the Fed to pursue an accommodative monetary policy that not only promoted an economic expansion but also was more conducive to keeping interest rates down and stimulating investment.

Lower interest rates and a declining national debt have important direct consequences for the budget. Interest outlays have fallen from their 1991 high of 3.3 percent of GDP to less than 2½ percent most recently, and they are projected to fall still further. The savings in interest payments on the national debt have been $xxx billion since 1993, compared with the pre-OBRA93 baseline. Lower interest rates have also benefited household borrowers. At current levels, each 1-percentage-point reduction in interest rates saves households about $860 per year

in payments on a $100,000, 30-year mortgage; $70 per year on a $10,000, 4-year car loan; and $140 per year on a $20,000, 10-year student loan. A rough estimate is that interest rates would have been 2½ to 3 percentage points higher if we were still on the pre-OBRA93 debt path (with Federal debt held by the public projected to be about 1.3 times GDP in 2012) instead of the current path (with that debt projected to be zero in 2012). [update with new debt-path estimates]

What Caused the Surpluses?

The policy changes mentioned earlier played an important role in bringing down the budget deficit. Budget enforcement rules required that tax cuts or increased spending in one area be offset by deficit-reducing measures elsewhere in the budget. In addition, the changes taking place in the economy generated large increases in income that caused Federal tax revenues, particularly individual income tax receipts, to rise faster than GDP without any increase in statutory tax rates.

Controlling Expenditures

Spending discipline and a strong economy have combined to push Federal budget outlays to their lowest level as a share of GDP since 1974. Total outlays declined from 22.2 percent of GDP in fiscal year 1992 to 18.7 percent last year (see Table 2.x). The aforementioned changes in net interest outlays accounted for 0.9 percentage point of this 3.5 percentage point reduction. Declines in discretionary outlays for national defense accounted for another 1.9 percentage points. Non-defense discretionary spending also fell slightly as a share of GDP. (Discretionary

Table 2-x.--Components of Federal Budget Outlays
(Percent of GDP)

	1992	2000	Change
Total Outlays	22.2	18.7	-3.5
Total Discretionary	8.6	6.5	-2.1
National Defense	4.9	3.0	-1.9
Non-defense	3.7	3.4	-0.3
Total Mandatory	10.4	9.9	-0.5
Social Security	4.6	4.2	-0.4
Means Tested Entitlements	2.3	2.4	0.1
Other	4.1	3.8	-0.3
Undistri-buted Offsetting Receipts	-0.6	-0.4	0.2
Net Interest	3.2	2.3	-0.9

outlays are for the programs subject to annual appropriations by the Congress; they account for about a third of total Federal budget outlays.) Discretionary spending has been subject to dollar caps since 1990, and these caps were generally effective over the 1990s in limiting the growth of outlays. The rest of the budget besides interest and discretionary spending consists of mandatory outlays on programs such as Social Security, Medicare, and food stamps, the amount of which generally depends on the number of beneficiaries and the amount of benefits to which they are entitled by law. Budget enforcement provisions did not put specific dollar limits on spending for mandatory programs, but did require that any legislation that would increase mandatory spending needed to be offset by an equivalent amount of deficit reduction.

Some Federal government expenditures, such as unemployment compensation, are sensitive to the business cycle, so that overall spending might be expected to fall as the economy booms. In general, however, the cyclical component of spending is much smaller than that of revenues. In the past, spending for welfare was sensitive to the business cycle, but the 1996 welfare reform legislation devolved control of program spending to the states and transformed

Federal spending into fixed block grants. Thus, any cyclical fluctuations in spending on these programs are now more likely to occur at the state and local levels than at the Federal level. The combination of low inflation and low unemployment has been especially helpful in keeping government spending down during this economic expansion, as both keep down the levels of indexed transfers. Changes to expenditure programs during this Administration have also been a factor. The 1996 reform reduced welfare caseloads by encouraging work, and the 1997 Balanced Budget Act made changes to the Medicare payment system that have at least temporarily constrained the growth in health care spending.

Rising Incomes and Revenues

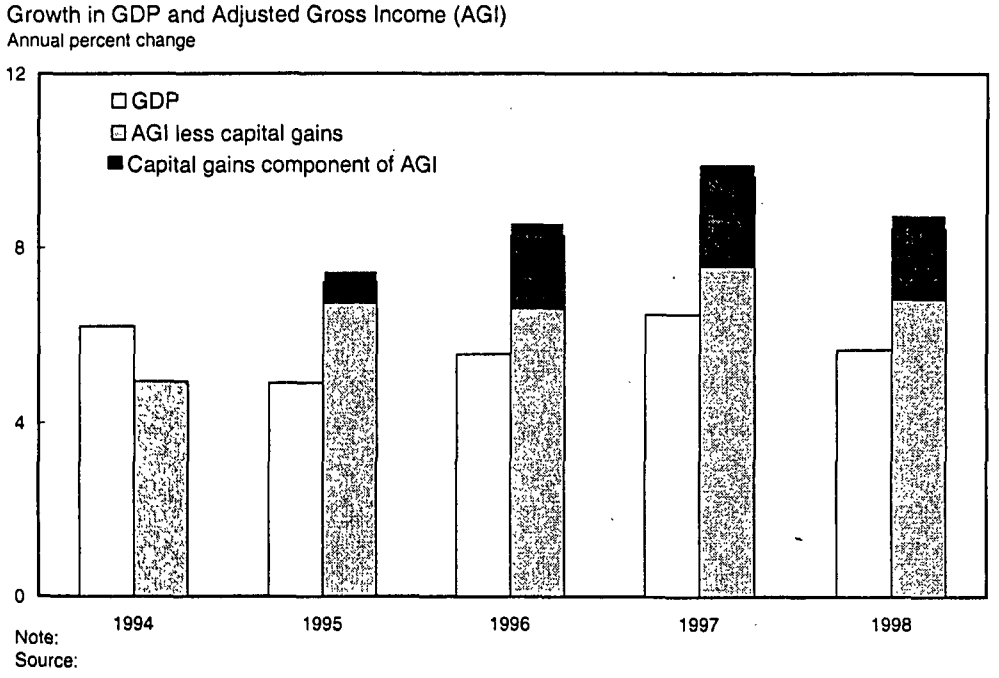
Federal government receipts vary with the business cycle, growing during booms and shrinking in recessions. In fact, receipts play an important automatic stabilizer role, falling faster than income during recessions, for example, and cushioning the impact of the recession on after-tax income. Thus, some of the improvement in the Federal budget since 1993 reflects a normal cyclical recovery. But growth in receipts, especially personal income tax receipts, has been especially strong in the past few years, when the economy has been expanding at a high level of employment, and even though tax rates have not increased.

Personal income tax receipts rose from less than 8 percent of GDP in 1994 to nearly 10 percent most recently, and the growth in that ratio contributed approximately $140 billion in additional revenues over the 1994-98 period. The faster growth in revenue relative to GDP

reflects two main factors: faster growth in taxable income than in income generally; and a rise in receipts arising from rising real incomes and the progressive structure of income tax rates.

According to Treasury Department and Congressional Budget Office analyses, nearly 60 percent of the increase in individual income tax liabilities relative to GDP arose from rapid growth in adjusted gross income (AGI) relative to GDP. Of this 60 percent, about 17 percentage points occurred because taxable components of personal income grew faster than the other income components of GDP. The rest reflects strong growth in sources of AGI that are not included in GDP (because they are not earned as a result of current production), such as capital gains realizations and retirement benefits—with capital gains being particularly important (Chart 2-15). Growth of capital gains alone accounts for 30 to 40 percent of the additional revenues.

Chart 2-15 **Adjusted Gross Income Has Grown Faster than GDP in Recent Years, Largely as a Result of Capital Gains**



Note:
Source:

Approximately 40 percent of the growth in individual income tax liabilities relative to GDP reflects the growth of revenues that results from rising real incomes in a progressive tax system. Although statutory individual income tax rates have not increased since 1993, the average tax rate on non-capital gains AGI has increased. Two factors account for most of this increase. First, for taxpayers in general, income has grown faster than inflation. As a result, more taxpayers have more income taxed in higher brackets, even though the brackets are indexed for inflation. Second, more taxable income is accruing at the top of the distribution of taxpayers, and hence more income is subject to the top tax rates. Tax return data indicate that the share of taxpayers with AGI above $200,000 (in 1998 dollars) rose over the 1994-98 period, and those taxpayers experienced higher-than-average growth in income. Incomes grew even faster for taxpayers with more than $1 million in AGI.

The share of income taxes collected from taxpayers at the top of the distribution has increased—but only because their pre-tax incomes have increased significantly; their share of total after-tax income has increased as well. The impressive growth in the stock market between 1994 and 1999 contributed to the taxable incomes of these households through higher capital gains realizations, greater taxable retirement benefits, and increased compensation in the form of stock options. Labor earnings, which have increased the most for two-earner couples at the top of the income distribution, have also contributed. Despite the significant capital gains tax rate reductions that took place in 1997, taxes paid on capital gains have continued to surge.

It bears repeating that the additional tax revenues that have contributed to an improved budget outlook have come during a period in which tax rates have not been increased at all for

the overwhelming majority of taxpayers, and no tax rates have been increased since 1993. The increases in marginal tax rates in OBRA93 affected only the highest-income households (1.2 percent of all taxpayers), but upper income households got tax relief in 1997 when capital gains tax rates were reduced. Taxpayers of more modest means enjoyed meaningful tax relief over this period. The EITC was expanded several times in the 1990s, most significantly in 1993; and taxes were reduced substantially for lower-to-middle income families in 1997 through the child tax credit and new education-related tax credits, which are phased out at higher income levels.. Thus, at any given level of real taxable income, average tax rates have been constant or falling after 1993. For a family of four earning the median income, real income has been rising while the average tax rate has been falling.

Thus, the strong revenue growth that has helped to produce growing budget surpluses and rising national saving has been associated with very strong increases in income. Indeed, real, after-tax incomes throughout almost all of the income distribution have risen strongly over the 1993-99 period. The rising tide has lifted all boats, even *after* inflation and taxes, and even as government deficits were eliminated. This experience contrasts with that of the 1980s, when higher after-tax private incomes came at the expense of public saving, and increases in income were more concentrated towards the top of the income distribution.

The Importance of Maintaining Fiscal Discipline

The improved budget outlook since 1993 reflects real changes in the economy and in policy, and represents a real achievement of budget discipline. The U.S. economy has reaped the

benefits of public-debt reduction and increased public saving. Nevertheless, the actual courses of the budget and the economy in the years ahead remain highly uncertain. This makes it especially important to maintain fiscal discipline now, when the economy is strong and we can most afford it, just as a family would save extra income in good times in preparation for any future rainy days.

Economic and policy uncertainty

As discussed in the outlook section, the economic assumptions underlying future budget projections reflect a prudent view of whether recent favorable economic developments will continue. This is not to deny that a serious economic downturn or an adverse productivity shock would cut into the projected surpluses and slow the paying down of the debt. Also, the recent very strong growth in revenue relative to GDP is unlikely to be sustained because taxable income—in particular the capital gains component—cannot continue to grow faster than GDP indefinitely. But the surplus projections in fact assume a leveling off of individual income tax collections relative to GDP, and a decline in total taxes relative to GDP. Even when uncertainties are acknowledged, it seems most likely that the budget can be kept in surplus if budget policy remains disciplined.

Maintaining that discipline entails an appropriate recognition of current policy priorities while preserving significant amounts of the available surpluses to meet future needs. Budget projections are typically based on current law and practice, but there are always pressures to change current law. For example, analysts have pointed to the possibility that discretionary

spending could rise faster than projected, that various tax provisions that are scheduled to expire will be re-instated, and that changes will be made to the alternative minimum tax provisions. The pressures to deviate from existing policies do not prove that projections of future surpluses based on those policies are unrealistic, but they do remind us that part of the challenge of maintaining fiscal discipline will involve addressing these issues.

The demographic challenge

One force affecting future budget surpluses that looks both large and inevitable is the aging of the population. Projections indicate that the population aged 65 and over will rise from its current share of about 12½ percent of the total population, to nearly 21 percent by 2040. As a result, the share of the population that is at or above retirement age relative to that of the working age population (the so-called aged dependency ratio) will rise dramatically.

These demographic changes imply changes in the demands that certain government programs place on the nation's resources and in the role these programs play in the dynamics of the Federal budget. Currently, Federal outlays for health and retirement programs for the elderly are a large share of the budget, but payroll contributions tied to Social Security and Medicare are even larger than the corresponding outlays for these programs. Thus, the Social Security system is currently a net contributor to the surplus. Fairly quickly, however, the surpluses in the Social Security system will start to shrink and eventually turn into deficits if the program is not changed. At the same time, retirement and health programs for the elderly will take up an increasing share of Federal outlays. Moreover, the per-capita costs of both Social Security and

Chapter 3

The Creation and Diffusion of the New Economy

AT THE HEART OF THE New Economy lie the dramatic technological innovations of the last several decades. Advances in computing, information storage, and communications have reduced firms' costs, created markets for new products and services, expanded existing markets, and intensified competition at home and abroad. These innovations came from a remarkable flourishing of entrepreneurship, mostly concentrated in "Silicon Valley" and other high-technology corridors. Indeed, the rapid growth of the information-technology (IT) sector is one of the most remarkable features of the 1990s. The computer and telecommunications industries have grown by XX% over the last decade. More recently, the Internet has spawned thousands of companies and created billions of dollars of market value. Wireless telephone carriers alone employ over 150,000 people in the United States and generate $44 billion in annual revenue.

It is widely recognized that the IT sector has been highly productive since the 1970s. This chapter shows that improvements in technology, along with intense competition and innovative organizational practices, have brought significant performance gains to many sectors of the economy. In manufacturing industries such as steel and automobiles, and service sectors such as retail trade and financial services, firms that have adopted IT are increasingly productive. Steel furnaces now use high-speed computers running neural networks to improve quality and reduce wear-and-tear on equipment. In automobile production, networked computers coordinate supply relationships, product development, and other aspects of operations, helping facilitate the

trend toward "flexible production," which allows rapid changeovers from one model to another on the production line.[1] In financial services, advances in IT have led to significant scale economies, reducing the costs of back-office operations, risk management, and customer support. Similar patterns of technological innovation are visible in many industries.

Technology alone, however, is not the sole driver of performance. During the 1990s, firms have found that technology has the biggest impact when combined with complementary organizational innovations such as incentive pay, flexible work assignments, and increased training. Moreover, intense competition, both at home and abroad, has forced firms to improve their performance (and weeded out those that don't). [Schumpeterian competition to go here?]

This chapter surveys recent technological improvements, explores the causes of the recent surge in innovation, and explains how changes in technology, regulation, and competition have transformed organizations, leading to significant performance gains. Our story is told in four parts. We begin by discussing improvements within the IT industry, focusing on microprocessors, disk drives, and fiber optics, showing how costs have plummeted as capabilities have increased. Future advances in networking, wireless communications, and biotechnology—all fueled by the technological breakthroughs of the last twenty years—will likely lead to even more impressive gains.

What explains this recent surge of innovation? Although the ultimate cause of innovation is human creativity, technical innovation nonetheless requires a particular support structure and well-defined rewards. Scientific and technical research and development must be funded; researchers must be trained; inventions must receive legal protection; and so on. Our second sec-

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[1] PIL, F. K., and J. P. MACDUFFIE (1996): "The Adoption of High-Involvement Work Practices," *Industrial Rela-*

tion explores these and other explanations for the increase in innovative activity. We focus on the demand for technology, financial-market innovations such as venture capital and a strong market for initial public offerings (IPOs), private and public R&D expenditures, and intellectual-property protection. None of these factors alone explains why the United States is awash in technology. It is the convergence of these factors during the last decade that has created a unique climate for entrepreneurs to discover new technologies and bring them to market.

The third section, "Performing in the New Economy," explains how firms are producing goods and services more efficiently through greater use of computers and information technologies and the development of complementary organizational practices. We emphasize how technology, regulation, and competition interact to provide new business opportunities and performance gains. The financial services industry provides a useful illustration of this interaction. As mentioned above, advances in IT have led to significant scale economies in financial services. In turn, deregulation now provides financial institutions the opportunity to exploit those scale economies (and increased global competition provides the incentive to do so). The combination of these factors helps explain the dramatic consolidation seen in this industry during the last few years. We go on to provide further examples of changes in firm boundaries, internal organization, and performance, including outsourcing, alliances, compensation, and job design. These changes in firm behavior, in many cases facilitated by the dramatic improvements in IT, are the immediate causes of the rapid productivity growth of the last five years.

We turn finally to an in-depth investigation of the performance gains brought about by new ways of doing business. As we explain, there is considerable evidence that IT and organ-

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tions, 35, 423-455.

izational change improve the performance of plants, firms, and industries. Globalization is also strongly linked to improvements in firm performance: access to global markets gives firms strong incentives to improve their products and services, while the presence of foreign competitors in domestic markets forces firms to do better to survive. As the competitive environment has changed, firms in many industries are increasingly turning to intangible capital—tacit knowledge, organizational routines, reputation, and the like—as a source of competitive advantage. This has important implications for firm strategy, as firms seek new ways to build and exploit their stocks of intangibles.

Technological Advances

The New Economy is universally associated with technology, and often with the Internet. But the Internet is only a recent phenomenon.[2] The productivity improvements associated with the New Economy have been associated with a series of gradually unfolding technological improvements with origins in post-WW II defense research [check]. Computers have become increasingly powerful, and the costs of processing, storing, and transmitting information have plummeted. Firms and other organizations have moved to exploit the opportunities provided by these new technologies and have, over time, developed the necessary software and organizational capabilities to translate these new investments into performance gains.

New systems that integrate information technology more heavily into firm activities promise to extend these gains. Since the 1990s firms have been spending billions on "enterprise resource management" (ERP) software, sophisticated systems that integrate ordering, procurement, inventory, finance, and human resources. Consumers are offered an increasing array of goods and

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National Institute of Standards and Technology, "Internet Security Policy: A Technical Guide."

services for wireless communication, digital entertainment, shopping, education, and other activities. In some industries, firms are taking advantage of technological improvements by refining, expanding, and consolidating their operations to reduce costs; in other industries, startup companies are using technology to create new products, processes, and markets.

Clearly, the IT sector—encompassing hardware, software, and telecommunications—has been one of the most innovative and visible sectors of the New Economy. IT now accounts for X% of GDP, up from Y% in 1993, and private investment has surged (see Chart 3-1). Advances within each area of IT have created new markets, extended existing markets, and improved the efficiency of firms and industries.

The most impressive technological advances have been in speed, storage, and data transmission. "Moore's Law"—the 1968 prediction that transistor density on silicon wafers would continue to double every 1–2 years—has held true, generating one of the most remarkable phenomena of the late twentieth century. The chip in the first IBM personal computer processed XX instructions per second; the chips in today's entry-level home computers process XX instructions per second. These advances, along with intense competition in computer assembly and distribution, have driven down quality-adjusted prices for computers and peripheral equipment by 67% between 1995 and 1999. This coincides with a dramatic increase in private investment in computers and peripheral equipment (see Chart 3-2). Complementary investment in software has nearly doubled. However, quality-adjusted prices of software have fallen by only 6%,[3] reflecting both the dynamics of software production and the difficulty of measuring quality improvements in this area (see Chart 3-3).

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[2] [Add data on household Internet access, number of businesses with a website, etc.]

Advances in data storage and transmission, which complement the computer revolution, have been equally as impressive. The cost per megabyte of disk-drive storage has fallen from over $100 in 1980 to 2 cents today.[4] The newest generation of "microdrives," designed for handheld devices like wireless phones and digital music players, hold a gigabyte of data, are smaller than a matchbook, weigh less than an ounce, and sell for under $500. (By contrast, the first gigabyte-capacity disk drive, introduced in 1980, was the size of a refrigerator, weighed 550 pounds, and cost $40,000.[5]) Since 1996, the transmission capacity of a single fiber-optic cable has increased by a factor of 20 in widely available commercial systems; experts anticipate this rate of technological progress to be sustained over at least the next 5 years.[6] These improvements, along with healthy competition in the telecommunications, have reduced the cost of communications dramatically. Information can now be accessed from anywhere in the world via the public Internet at no (additional) cost to the user. The emerging communications infrastructure allows firms to collect, store, process, and transmit information at higher volume and lower cost. Between 1970 and 1999 the cost of sending 1 trillion bits electronically fell from $150,000 to 12 cents.

Networks are also expanding rapidly. Economists use the term "network effects" to explain that the benefits of being on a network depend on how many other people are also on the network. (Who would want to be the only person in the world with a fax machine?). The number of Internet hosts, a proxy for the number of connections to Internet, has increased exponen-

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[3] Survey of Current Business, April 2000, Table 5.5, p. 74.
[4] Clayton Christensen, *The Innovator's Dilemma* (Boston: Harvard Business School Press, 1997), p. 8; CEA analysis.
[5] IBM press release, June 20, 2000,
http://www.ibm.com/Press/prnews.nsf/topic/9BE18BD9077C56ED8525690400502199.

tially since 1980. Nearly 54% of U.S. households have access to the Internet and surveys indicate that over 50% of U.S. businesses will sell products online in the year 2000.[7] Traditional firms and new firms alike are competing to deliver consumers higher-speed access to the Internet and more sophisticated services for this new medium. This suggests that the value of today's Internet is growing at an extraordinary rate.

As firms have rushed to adopt this increasingly ubiquitous, lower cost information technology and incorporate it into their business, employment in the computer-services sector has surged. Employment in this sector has more than doubled between 1993 and 1999, compared with an 18% increase in total U.S. employment during the same period (see Chart 3-4).

Taken independently, the dramatic technological advances described above would have been unlikely to produce the dramatic impact on firms and consumers that are characteristic of the New Economy. As the Internet example clearly shows, the most important breakthroughs often result from the *convergence* of individual technologies—in this case computers, data storage, and communications. Furthermore, technology is considerably more valuable to firms when combined with complementary human capital and the appropriate organizational routines within an organization, and when contractors outside the organization are available for development, implementation, and maintenance. The convergence of these technological advances, in combination with changing firm routines, has fueled much of the development of the New Economy.

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[6] Coffman, K. G. and Odlyzko, Andrew. "Internet Growth: Is There a 'Moore's Law' for Data Traffic?" AT&T Labs Research Working Paper, 2000, p. 28.

[7] NUA Internet, "How Many Online," September 2000 (www.nua.ie/surveys/how_many_online); Internet Economy Indicators, October 6, 2000 (www.internetindicators.com/facts.html).

Why Is the U.S. Economy Awash in Technology?

What explains this recent surge of technical innovation? Of course, the ultimate cause of innovation is human creativity. Nonetheless, technical innovation does not occur in a vacuum; it requires a structure of incentives and institutions. Firms demand technology to reduce costs and to provide new products and services valued by their customers. Scientific and technical research and development must be funded; researchers must be trained; inventions must receive legal protection; and so on.

Government policies that foster competition, encourage research and development, and reduce trade barriers are important in this regard. The Administration has worked hard to provide an environment that allows entrepreneurship to flourish, particularly in the high-technology sector. For instance, the Administration supported a moratorium on U.S. Internet taxes under the Internet Tax Freedom Act and worked for a freeze on trade duties for electronically traded goods within the World Trade Organization. To encourage open markets in high-technology goods and services, the Administration signed the Information Technology Agreement, which will eventually eliminate tariffs on $600 billion worth of goods, and the World Trade Organizations Basic Telecommunications Agreement, which will promote competition and privatization in a global telecommunications services market worth $1 trillion.

Domestically, President Clinton signed the Telecommunications Act of 1996, the first comprehensive telecommunications reform legislation in over sixty years, which lowered prices, increased customer choice, and sped the deployment of new telecommunications technology. In September 2000 the President signed an Executive Memorandum directing federal agencies to work with the Federal Communications Commission and the private sector to identify the radio spectrum needed for "third generation" wireless technology.

To encourage private-sector R&D, the Administration worked to extend the Research and Experimentation tax credit through June 30, 2004, the longest extention of the policy ever. At the same time, the Administration has supported significant increases in funding for the National Science Foundation (NSF). The NSF budget was increased by 10% in fiscal year 1999, the largest-ever increase, and included more than a 16% boost for computer science research. The fiscal year 2000 budget contained a 6.6% increase in the National Science Foundation research budget, including $126 million for the Administration's "Information Technology for the 21st Century" initiative.

Within this favorable climate, technological innovation has proceeded at a rapid pace. This section discusses the demand for technology, financial-market innovations such as venture capital and initial public offerings that support technology firms, the role of R&D expenditures in technological development, and the importance of legal protection for technical discoveries. It highlights four important features of the New Economy. First, intense competition and positive feedback drive the development and adoption of new technologies. The availability of one technology stimulates demand for complementary technologies, which in turn drives prices down and encourages further demand for the initial technology. Second, significant financial-market innovations have lowered the cost of capital for new businesses. While public stock markets are still extremely important, providers of private equity such as "angel" investors and venture capitalists are playing a larger role, particularly in the technology sector.

Third, the process of funding research and development has changed. The federal government continues to be a major provider of funds for R&D. However, the emphasis of federal funding has shifted from defense-related technologies to civilian products and services. Private R&D has soared, particularly at smaller firms and service firms. Private firms are also devoting

an increasing fraction of their research budgets to basic, rather than applied, research. This suggests that the current technology boom is far from over.

Fourth, the innovative process has itself been transformed. Traditionally, innovation has been a highly centralized activity, performed mostly by large firms working independently. Today, innovation is a more decentralized process, performed increasingly by smaller firms that collaborate with each other, with academic institutions, and with government agencies.[8] This is seen clearly in the computer industry itself, formerly dominated by large, vertically integrated firms such as IBM and now frequently led by smaller, more specialized firms using "modular" technologies that are easily shared among market participants.

The combination of these factors explains why the U.S. has seen so much technological innovation over the last decade. We next consider each in turn, beginning with the demand for new technology, then moving to financial-market innovations, R&D, and intellectual-property protection.

The Demand for New Technology

The demand for new technology exhibits "positive feedback"—technological improvements generate increased demand for technology, which fuels further improvements. Several types of feedback are important here. First, in a market characterized by network effects, the more users that have adopted a particular technology, the more valuable owning it becomes. For example, the telephone, the fax machine, e-mail, or an instant messenger client all are more valuable to a particular user the larger the number of other users. Today, household telephone

[8] [This last part isn't particularly new, e.g., in defense procurement, where large contractors always worked closely with their government customers.]

between components and even entire products, demand for individual components and given products become highly interdependent.[14]

In the United States, deregulation, openness to foreign competition, and low administrative barriers to entry and exit have led to highly competitive markets, providing strong incentives for firms to adopt new technologies. Organizations are often resistant to technological change. Firms find the prospect of adopting new technologies costly and risky; some of this risk stems from changing relationships, communications practices, and organizational structures that are required to take full advantage of the new technology. A firm with a protected market position can avoid making these productivity-enhancing changes and still remain viable and profitable. Firms in highly competitive environments, however, cannot.

In addition to the highly competitive IT manufacturing sectors, which have been remarkable users of new technology,[15] competition has driven technology adoption in telecommunications services, trucking, banking, and retailing.[16] In some cases, competition may even drive demand for new technology that, in the absence of adoption by a competitor, may not increase profits. For example, one on-line broker's investment in software providing free stock quotes to its customers may force its competitors to follow suit or risk losing customers for whom this service is valuable.

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[14] BALDWIN, C. Y., and K. B. CLARK (2000): *Design Rules: The Power of Modularity*. Cambridge, MA: The MIT Press.

[15] For example, see Cisco's use of the internet for sales and customer service or Dell's use of the on-line ordering model.

[16] MOWERY, D. C. (1999): "U.S. Industry in 2000: Studies in Competitive Performance," Washington, DC: National Academy Press.

Financial-Market Innovations

Firms—especially small, innovative startup companies—need funds, guidance, and other forms of support for all aspects of operations, not just research. The United States has offered a uniquely supportive climate for technology startups. Individual investors, or "angels" have provided money for many firms at the seed stage, where a product concept is developed. Additional funds are provided through the private placement market – essentially equity offerings to a limited audience. The Government has also had a role in supporting innovation through the Small Business Innovation Research program. However, in quantitative and qualitative terms, the most important phenomenon has been the recent acceleration in growth of venture capital, which itself has benefited from a thriving market for initial public offerings (IPOs). The availability of venture capital has lowered the startup costs for aspiring entrepreneurs, while a capital gains tax differential has provided increased incentives for venture capitalists to make funds available. Furthermore, a rising stock market may encourage venture capitalists to support startups, in expectation that a subsequent public offering or sale can generate large returns.[17]

Venture capital is a form of private equity that targets start-up firms primarily in uncertain, knowledge-intensive industries. Venture capitalists do much more than supply funds, however. Besides matching investors, such as individuals, banks, and pension funds, with entrepreneurs, they also advise, monitor, and support the projects they fund. Technology firms face two special obstacles. First, the profitability of the projects they pursue is extremely difficult to assess, while the entrepreneur's behavior is also more difficult to monitor. Venture capital firms respond by being deeply involved in the development of the typical startup. Typically, one or

more of the venture capitalists "lead investors" join the firms' board of directors, thereby closely monitoring the entrepreneur's activities. Additional control is exerted by the method in which financing is provided -- the investment is staged, such that funds are disbursed only when the firm meets preset milestones.[18] Second, since technology entrepreneurs often have little experience in general management, venture capitalists often advise on the selection of key personnel and on the acquisition of legal and financial services. Venture capitalists are also deeply involved in making strategic choices.

Venture capital as a mode of investment appears to be quite profitable.[19] During the 1980's, venture capital investment grew on average by 17%; then during the 1990's, the pace doubled.[20] Indeed, total venture-capital investment jumped from $14.3 billion in 1998 to $36.7 billion in the first half of 2000 alone (see Chart 3-5).[21] Venture Economics estimates that $134.5 billion was under venture capital management at the end of 1999.[22] Analysts pointed to the large sums raised at the beginning of 1999, and to a new group of promising projects in Internet-related businesses, as the driving factors for this surge in financing.[23] Whether the rapid pace of growth can be maintained depends upon a number of economic factors; one key variable is the strength of the IPO market.[24] Since the most profitable manner for a venture capitalist to exit

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[17] As argued in B. Black and R. Gilson, "Does venture capital require an active stock market?" J. Applied Corp. Finance, Winter 1999.
[18] Description in M. Kenney, 2000, "Note on 'Venture Capital'", forthcoming in International Encyclopedia of the Social and Behavioral Sciences, edited by NJ Smelser and P.B Baltes, Elsevier (Article #5.1 68). Also, Gompers and Lerner, 1999, The Venture Cycle, pp. 4-5.
[19] Venture Economics, 2000, NVCA Yearbook 2000, page 13, cites 15-20% long run overall return since inception. One year return for the period ended Sept. 1999 is 91.2% (page 14).
[20] Calculations based on NVCA Yearbook 2000 data, 1980-1990; 1990-1999 subsamples.
[21] PriceWaterhouseCoopers, LLC, 2000, *MoneyTree US Report* 2000Q2.
[22] Venture Economics, 2000, National Venture Capital Association Yearbook 2000, page
[23] Conversation with Kirk Walden, PWC-MoneyTree, October 11, 2000.
[24] Gilson and Black, op. Cit.

from its investment position is by having the firm float a public issue, a large and buoyant equity market is critical.

The Government has long been active in the venture capital business. Congress created the Small Business Investment Corporation (SBIC) program in 1958. SBICs are privately owned and managed investment firms, licensed by the Small Business Administration, that may borrow some funds from the government in order to provide venture capital funding to entrepreneurs. In 1999, SBICs provided $3.7 billion to 3,700 companies.[25]

Some observers have questioned whether the large amount of funds described as venture capital really signals an increase in the net resources available to entrepreneurs. Venture capital could substitute for other sources of funding. Indeed, through semi-autonomous organizations, large firms in the computer hardware and software industries now make about 15% of total venture capital investments, investments that might have been counted as corporate investment in the past.[26] [27] Still, it seems apparent that funds devoted to venture capital and corporate R&D are very different in their effects. [28]

There is some econometric evidence that the participation of a venture-capital investment acts as powerful stimulus to innovation, as measured by patent activity.[29] Of course, it is difficult to disentangle cause and effect; however, an attempt to account for possible reverse causality yielded similar conclusions.

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[25] 1999 figure provided in Round 1 Comments by SBA.
[26] Takahashi, Dean, 2000, "Intel and Vadasz Roll the Dice on Upstarts – and Hit Jackpot," Wall Street Journal Interactive Edition (February 8, 2000).
[27] Spreadsheet provided by John Taylor, NVCA.
[28] Gompers and Lerner are skeptical, citing the Xerox case. Need info on Microsoft, AOL. Gompers, Paul A. and Josh Lerner, 1999a, *The Venture Capital Cycle*, Cambridge, MA: MIT Press (pp. 97-105).
[29] Kortum, Samuel and Josh Lerner, 2000, "Assessing the contribution of venture capital to innovation," Working Paper (July), p.29. Paper forthcoming in *Rand Journal of Economics* (Winter 2000). Estimate pertains to data extending up to 1992.

More generally, the thriving venture-capital industry is but one part of a growing domestic private-equity sector. In the United States, the private-equity sector has been largely fragmented into two groups, each focusing on different types of investments. Firms focusing on early-stage investments in startup or newly formed entities are termed "venture-capital firms," while investment groups that pursue opportunities in existing, more mature companies with stable earnings and cash flow are called "buyout firms." There are now at least 800 established buyout firms in the United States, with close to a trillion dollars in leveraged assets under management. These privately held firms specialize in leveraged acquisitions, recapitalizations, management buyouts, and other restructurings. In principle, buyout firms can reduce agency costs by actively monitoring managers and can avoid the collective-action problems that limit effective control by institutional owners such as banks and pension funds. During the last five years or so, several buyout firms have begun investing in Internet startups, while venture-capital firms that previously specialized in managing early-stage ventures have participated in buyouts of technology firms.

In addition to venture capital, the U.S. public capital markets have also served as an extremely important source of capital for new businesses during the second half of the 1990s. The gross proceeds from initial public offerings in the five years ending in 1999 were $204 billion, compared with only $156 billion for the twenty preceding years! (See Chart 3-6.) About a third of these funds went to established enterprises going public for the first time, or to newly divested subsidiaries of existing corporations. The rest, however, went to new businesses. An active IPO market fosters innovation by providing capital for new enterprises, and by providing an attractive exit mechanism for financiers of early-stage, risky ventures, making these financiers more will-

ing to provide risky capital. It also provides liquidity for entrepreneurs, who can appropriate some of the value their efforts have created while retaining at least partial control of their firms.

Of some concern, however, is the strange behavior of IPO pricing, especially in 1999 and 2000. In 1999, average first-day return (calculated as price at the end of the first day of trading divided by the offering price) for IPO securities was 69% (see Chart 3-7). This was 3 times higher than the average first-day return in any year between 1975 and 1999. This anomaly is due either to "irrational exuberance" on the part of investors, persistent underpricing by the underwriters of these securities, or both. Evidence on the long-term performance of IPOs is mixed.

In short, capital-market advantages have been important for technological development. The flourishing venture-capital market and the availability of additional funds from IPOs are unique features of the U.S. economy, and may help explain why the New Economy emerged here.

R&D in the New Economy

As the economy has become "lighter"[30] and has shifted toward products embodying more knowledge capital and less physical capital, R&D—the principle means by which knowledge capital is created—has risen dramatically. Moreover, the R&D process is in the midst of a transformation, away from the centralized model pursued by large R&D labs after WW II and toward a more decentralized model involving more small-firm R&D and increasing collaboration between firms to bring products and services to market.

Between 1995 and 1999, real R&D spending in the United States grew at an annual rate of nearly 6 percent, representing a substantially increased commitment to innovation. Private

made customer information a strategic asset, one which firms are increasingly looking to take advantage of. Customer loyalty programs have also expanded, facilitated by information technology.[104] {Peter: Many of these trends, it seems, have been going on for a long time. They have continued to grow strongly in the late 90s and may be more efficient now?}

The Internet has also radically altered how producers and sellers of consumer goods interact with their customers. At relatively low cost, a manufacturer or retailer can now communicate with customers anywhere in the world. A great number of consumer goods firms—from automobile to apparel—have taken advantage of this capability, offering products and / or product information via the Internet. Consumers with access to the Internet can now do comparison shopping at very low cost before leaving the house or placing their on-line order. Internet sales to consumers reached $5.5 billion in the second quarter of 2000, accounting for less than 1 percent of retail sales. The Internet has also created new transaction mechanisms, such as online auctions, that alter the more established purchasing process.[105] Evidence suggests that these tools are facilitating greater trade in secondary goods and remainders than had occurred previously.[106]

Changes in Firm Boundaries

Changes in firm size are an important feature of the New Economy. In the technology sector, large fixed costs and small marginal costs, combined with first-mover advantages and network effects, have created scale economies leading to highly concentrated markets. On the

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[103] BLATTBERG, R. C., and J. DEIGHTON (1991): "Interactive Marketing: Exploiting the Age of Addressability," *Sloan Management Review*, 5-14.
[104] For more on Customer Relationship Management see www.epiphany.com.
[105] [box in last year's ERP]
[106] Forrester Research, March 1999. "Consumers Catch Auction Fever."

other hand, the rapid pace of technological change, along with the need for faster response times associated with increases in global competition, often give advantages to smaller, more specialized firms.[107] [SBA: Can you recommend data?]

Changes in firm boundaries are best understood from within the "contractual" framework associated with Ronald Coase.[108] Coase was the first to explain that the boundaries of the organization depend not only on the productive technology, but on the costs of transacting business. In the Coasian framework,[109] the decision to organize transactions within the firm as opposed to on the open market—the "make or buy decision"—depends on the relative costs of internal versus external exchange. The market mechanism entails certain costs: discovering the relevant prices, negotiating and enforcing contracts, and so on. Within the firm, the entrepreneur may be able to reduce these "transaction costs" by coordinating these activities himself. However, internal organization brings other kinds of transaction costs, namely problems of information flow, incentives, monitoring, and performance evaluation. The boundary of the firm, then, is determined by the tradeoff, at the margin, between the relative transaction costs of external and internal exchange. In this sense, firm boundaries depend not only on technology, but on organizational considerations; that is, on the costs and benefits of various contracting alternatives.

The rise in outsourcing of specific functions and tasks also reflects a change in firm boundaries. IT reduces the transaction costs associated with communication and coordination among business partners, leading firms to outsource some tasks previously performed internally. Indeed, outsourcing growth has been more rapid than overall growth: employment in the man-

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[107] [Elaborate on this last point.]
[108] Coase, 1937.
[109] Williamson (1975, 1985, 1996), Klein, Crawford, and Alchian (1978), Grossman and Hart (1986), Hart and Moore (1990).

agement and consulting services industry grew 24% between 1993 and 1999, and management consulting employment grew almost 70% in the same period (total employment growth was 18%).[110] (See Chart 3-13.) Firms routinely outsource strategic development and the management of their IT, human resources, and facilities operations to firms that specialize in these functions.[111]

Firms have chosen to outsource for several reasons. Contractors that specialize in a particular function may have competitive advantages in performing these functions relative to in-house staff and service groups,[112] and reducing operating costs is one of the most frequently cited reasons for outsourcing.[113] Contracting out can contribute to a firm's productivity in other ways. By contracting out for services that support the primary business of the company, outsourcing allows management to focus its effort on doing its core business better. In addition, outsourcing provides firms with access to expertise that would be costly and time-consuming for the firm to recruit and obtain, and for which they have only short-term needs. This expertise can speed the flow of ideas and innovations to the firm. Finally, firms can use outsourcing to obtain flexibility, because they can quickly access capabilities and do not have to invest in as much physical plant and overhead.[114] At the same time, outsourcing carries risk for firms, as they may lose control of key operational aspects or skills. Further, temporary employees and contractors, who are the

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[110] Census employment statistics. We can update with mid 2000 data later. Earliest data for these industries is 1988, if we want to go back a little farther.

[111] 1999 Outsourcing trends report. Data reports% expenditures by function for sample size of 200 survey respondents. Looking for more extensive data.

[112] Quinn, Sloan Mgmt Review, summer 99

[113] 1999 outsourcing trends report

[114] [We could put in a box on government outsourcing. (See WEB article on DoD competitive sourcing; have been some studies of state and local government outsourcing too.) One big advantage of government outsourcing is that there are some savings estimates. It is hard to find savings estimates on outsourcing in the private sector. It can be a sensitive topic—govt employee unions oppose it.]

outsourcing suppliers for short-term labor, are often paid less, are less likely to have benefits such as health insurance, and have less job security.

The last decade years has also witnessed an increase the number of in strategic alliances, long-term agreements between firms to share facilities, expertise, and other resources to accomplish joint goals.[115] The number of new alliances formed by U.S. firms jumped from XXX in 1990 to XXX in 1999. U.S. firms have been particularly active in forming alliances: over the 1990–99 period, firms in the United States accounted for about two-thirds of the alliances among OECD nations.[116] Strategic alliances, like other long-term contracts, allow firms to combine some aspects of their operations without incurring the costs of full integration. For example, an alliance with a key supplier can help stabilize the supply chain, while a marketing alliance may allow two firms to pool their resources for higher joint gains. And, as discussed above, firms may also ally in order to develop a new technology or to exchange existing capabilities.

In other industries, such as telecommunications, energy, and financial services, firms have been combining their operations through mergers and acquisitions. In financial services, the primary sources of structural changes have been IT and deregulation. For instance, since the Bank Holding Company Act of 1956, geographic restrictions on banks have been slowly lifted, enabling banks to expand gradually across state lines. Although barriers to interstate banking were not completely removed until the enactment of the Riegle–Neal Act in 1994, regional and interstate pacts enabled bank holding companies (BHCs) to operate across state lines. One study

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[115] Arvind Parkhe, "Strategic Alliance Structuring: A Game Theoretic and Transaction Cost Examination of Interfirm Cooperation," *Academy of Management Journal.*
[116] Kang and Sakai 2000

estimates that by 1994, a BHC in a typical state had access to nearly 70% of U.S. gross domestic banking assets.[117]

As banks expand, they have also begun to consolidate. Over a third of all banking organizations disappeared during the 1979–94 period, while total banking assets continued to increase.[118] Between 1988 and 1997, the numbers of standalone banks and top-level BHCs both fell by almost 30%, while the share of total U.S. banking assets held by the top eight banking organizations rose from 22.3% to 35.5%.[119] In 1998, four of the top ten U.S. "mega-mergers," based on market values, occurred in financial services.[120] These changes are not confined to the United States; two Japanese bank mergers currently pending will create the two largest banks in the world, with about $2.5 trillion of assets between them.[121]

Deregulation is thus an important cause of geographic diversification and consolidation.[122] Prior geographic restrictions on competition may have allowed inefficient banks to survive, and the gradual removal of these restrictions has transformed the structure of the industry. One study shows that state-level merger and acquisition activity increased substantially as those states joined interstate banking arrangements.[123] As a result, the percentage of deposits held by subsidiaries of out-of-state BHCs increased from two% in 1979 to 28% in 1994.[124] Moreover,

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[117] Berger, Kashyap, and Scalise 1995.
[118] Berger, Kashyap, and Scalise, 1995.
[119] Berger, Demsetz, and Strahan, 1999.
[120] By contrast, the 1989 acquisition of RJR-Nabisco by Kohlberg Kravis Roberts & Co., considered the capstone of the "decade of greed," was valued at only $24.7 billion.
[121] Allen Berger, "The Integration of the Financial Services Industry: Where Are the Efficiencies?" Working paper, Board of Governors of the Federal Reserve System, 2000.
[122] Kroszner and Strahan (1999) show that deregulation is itself endogenous: deregulation occurred later in states with relatively more small banks (which are likely to oppose relaxation of interstate banking restrictions) and a relatively large insurance sector in states where banks can sell insurance. Their findings tend to be more consistent with private-interest than public-interest explanations for regulation.
[123] Jayaratne and Strahan (1998)
[124] (Berger, Kashyap, and Scalise, 1995)

the Glass–Steagall prohibition on combining commercial and investment banking was slowly lifted. In 1987 the Federal Reserve Board began permitting BHCs to engage in limited nonbank activities through "Section 20" affiliates. Section 20 activities were originally limited to five% of a subsidiary's total revenue, but the limit was raised to ten% in 1989 and 25% in 1996.

In 1999, many of the Depression-era restrictions on banks were formally removed with passage of the Gramm-Leach-Bliley (or Financial Modernization) Act. The Gramm-Leach-Bliley Act lifts these regulatory barriers by creating a uniform regulatory framework governing affiliations among different financial services institutions, and by expanding the range of investments available to these firms. The new law allows banks, security firms, and insurance firms to affiliate under a new rubric, that of a Financial Holding Company (FHC) By August 2000, 340 FHCs had been formed, with assets representing 12% of all U.S. financial sector assets.

Expansion, consolidation, and diversification can bring about performance improvements by allowing financial institutions to realize economies of scale. These scale economies are largely driven by innovations such as new financial instruments and risk-management techniques, ATMs, phone centers, and Internet banking.[125] Recent evidence indicates that bank efficiency has indeed improved, particularly when new banking organizations have been created through mergers and acquisitions. Bank mergers have produced average improvements in cost efficiency (here measured as the distance to the industry "best-practice" frontier) of about 80%, along with improvements in profit efficiency of about 50%.[126] Large banks have also seen significant improvements in their abilities to manage risk; the costs of financial distress, bank-

[125] (Radecki, Wenninger, and Orlow, 1997)
[126] Berger and Humphrey, 1997, as cited in Berger, 2000; need to check these figures carefully!

ruptcy, and charter loss have been reduced.[127] Moreover, contrary to concerns that large banking organizations would focus exclusively on large customers, small-business lending has not been adversely affected by bank mergers and acquisitions.[128] [Role of antitrust policy here?]

In short, technological innovation, deregulation, changes in the competitive environment facing firms have led to a variety of changes, with an uncertain overall effect on firm size and scope. Some industries have witnessed a rise in outsourcing, while others have seen increasing consolidation.

Business Strategy and Rivalry

Several observers note that information, and not tangible products, is the most important economic good in the New Economy.[129] Of course, so-called "information goods," from books, music, and television programs to the yellow pages and real-time stock quotes, have long been an important component of the U.S. economy. During the last decade, however, cost reductions in duplication, storage, and data transmission have substantially reduced the cost of delivering information goods to consumers. This has led to an increase in the number of firms focused on delivering specialized content to new users, and it has led incumbent firms to revisit their strategies for maximizing the value of the information that they create and distribute.

The production of information tends to be characterized by high fixed and sunk costs and low variable costs; computing and the Internet reduce these variable costs nearly to zero. When consumers' preferences are relatively similar, markets may be highly concentrated. For exam-

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[127] Berger, 2000.
[128] Philip E. Strahan and James P. Weston, "Small Business Lending and Bank Consolidation: Is There Cause for Concern?" *Current Issues in Economics and Finance,* Federal Reserve Bank of New York, March 1996.
[129] Source for much of this and the next three paragraphs: Shapiro and Varian, *Information Rules.*

ple, few markets are served by more than two yellow-pages providers.[130] However, when some consumers' preferences vary widely, multiple producers may enter the market and find it profitable to serve small niches of consumers. Although major television networks account for over 50 percent of viewership in prime time, hundreds of other cable television channels cater to specific viewer tastes.[131] The low cost of distributing information via the Internet has led information providers to rethink their strategies for reaching consumers. Most major magazines and newspapers now offer a free online version that competes directly with their paper version, while others offer unique online content for free or premium services such as clipping services or customized content for an additional fee. Some information providers have integrated with distribution channels such as cable operators [FCC: correct term?] and even Internet access providers, while others have chosen to remain independent.

The New Economy has also brought the issue of technology standards to the forefront of strategic decision-making. In the United States, technology standards are established by *de facto* competitive performance, not by government regulation. In markets subject to the network effects, or positive feedback as discussed above, standards are often critically important for technologies to reach the largest number of possible customers. Markets with strong network effects are often characterized by "tipping." When it becomes apparent that one technology has a large enough lead, the market may "tip" with nearly all the subsequent consumers adopting that technology. Pricing and advertising decisions are crucially important in such "winner-take-all" markets.[132] Intense early competition to build a base of loyal users and predatory product an-

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[130] Marc Rysman, "Competition Between Networks: A Study of the Market for Yellow Pages." Working paper, Department of Economics, Boston University, 2000.
[131] Neilsen Media Research, "Primetime Network Rating & Shares"
[132] [Actually, "winner-take-most."]

nouncements (so-called "vaporware") may result.[133] The propensity of markets with network effects to tip poses important challenges to regulators and antitrust authorities.[134] [Elaborate.] These dynamics also encourage the formation of industry alliances to promote a standardized technology, in some instances by sharing intellectual property and marketing expenses.[135] As has been recognized by the U.S. legal code and anti-trust authorities, such collaboration need not preclude vigorous competition in the product market.

For traditional retailers and manufacturers of branded consumer goods, the Internet has created a new distribution channel. This has raised significant issues about how to compete, especially for firms with investments in physical distribution infrastructure. For manufacturers selling through intermediaries such as department stores, the internet enables direct sales to customers, but requires new infrastructure for billing, order fulfillment, delivery, and handling individual returns. The potential profits from selling additional products at retail prices must be measured against the cost of developing these new capabilities and potential lost sales through existing channels. A major sports apparel producer now sells through four different channels, the Internet, sporting goods stores, department stores, and company stores. For bricks-and-mortar retailers, on-line sales may compete directly with their own retail business. This has led some firms, such as one large book retailer, to separate online and bricks-and-mortar operations in order to offer the best incentives to both organizations.[136] Other retailers have chosen hybrid strategies, allowing customers to buy on-line, but funneling all returns and customer service

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[133] FARRELL, J. P., and G. SALONER (1986): "Installed Base and Compatibility: Innovation, Product Preannouncement, and Predation," *American Economic Review*, 76, 940-955.
[134] KATZ, M. L., and C. SHAPIRO (1994): "Systems Competition and Network Effects," *Journal of Economic Perspectives*, 8, 93-115.
[135] Potential source: Brandenberger and Nalebuff, *Coopetition.*
[136] Barnes and Noble and barnesandnoble.com

through existing stores. Still others bricks-and-mortar retailers forged partnerships with on-line retailers to satisfy the needs of on-line shoppers.[137]

Competition and Creative Destruction

For firms, the U.S. economy in the late 1990s has been characterized by both high profitability and high risk. To wit, of the thousands of e-commerce start-ups launched in the past few years, over a hundred have reportedly shut their doors.[138] Yet others have made remarkable inroads against the established firms and even have changed industries. Market competition is an evolutionary process whereby entrepreneurs launch new companies to challenge existing firms, occasionally overturning them but just as often failing. Nowhere is this process—what the economist Joseph Schumpeter called "creative destruction"—more dynamic than in the U.S. economy. As Chart 3-14 illustrates, the remarkable growth of the U.S. economy in the 1990s has not been associated with a reduction in business failures. On the contrary, during the current expansion business failures have hovered near their post-1980s average.

As the business failure statistics suggest, today's firms are subject to competitive pressure—from domestic and foreign sources—that is as intense as at any time in previous history. But despite this competitive pressure, corporate profits have exhibited strong growth. Since 1993, corporate profits in real terms have risen at a 5.7 percent annual rate. This compares favorably to the period between 1980 and 1992, when real corporate profits rose at a 2.2 percent annual rate and to the period between 1950 and 1992, when real corporate profits rose at a 3.2

[137] e.g., Rite-Aid and Drugstore.com
[138] Bloomberg, 11/16/00. (see Menzie for source)

percent annual rate. (See Chart 3-15.) U.S. firms have learned how to compete, and to navigate successfully through Schumpeter's "perennial gale of creative destruction."

Understanding Performance Gains

Throughout this chapter we have documented the extensive changes in firm organization and strategy brought about by technological change. Ultimately, however, to explain the effects of IT on the aggregate productivity gains reported in Chapter 1, we must link these technological and organizational improvements to realized performance gains. Fortunately, new academic studies are beginning to document the performance effects of IT and associated organizational changes at individual plants and firms. This evidence strongly supports the idea that IT, when combined with the appropriate organizational structures, improves performance.

How Do Technology and Organizational Change Improve Performance?

As emphasized above, investments in IT work best when combined with complementary changes in business and production practices. Performance improvements are most likely to be realized when firms couple IT investments with changes in basic business practices—job design, organizational structure, interactions with customers and suppliers and human resource practices such as incentives and decision making authority—that are designed to allow employees to use the new technology most effectively. Adopting these complementary practices is a key feature of the successful introduction of IT, and differences in adoption patterns and rates across plants may explain why the productivity effects IT investments were not immediate and have not been realized by all firms.

The lag and variability in productivity gains after investing in IT can be due to the time required for the employees to adjust to the new technology. Implementing automated equipment

CHAPTER 4

THE NEW ECONOMY IN A GLOBAL CONTEXT

PARTICIPATION IN THE GLOBAL ECONOMY has made a vital contribution toward raising U.S. economic performance. This is because globalization leads to more competition and specialization, thereby inducing innovation, higher productivity, and thus stronger growth. At the same time, improvements in communications and technology have spurred deeper integration between the United States and the world economy. This chapter explores the connection between these two phenomena: increased globalization that contributes to better economic performance, and advances in communications and technology that allow for deeper integration and expanded international trade and financial flows.

Policies that have promoted a more open global economy have played a key role in generating economic success in the United States. Openness and increased globalization provide benefits along a number of dimensions. Countries gain by specializing in sectors in which they are relatively efficient. With open markets, firms are able to use the best and most cost-effective inputs from global sources in order to lower their costs and improve productivity, and can in turn supply products to the expanded global market. International competition spurs firms to innovate and increase productivity, and higher productivity raises wages and incomes, and leads to higher standards of living. Consumers gain as well from expanded choices and lower prices.

Globalization has also helped to support the high rate of investment that has played an important role in the economic expansion, as increased capital flows into the United States have made it possible to maintain investment in excess of domestic saving. An example of the importance of global markets can be seen in the increased usage and production of computers in

the United States in recent years. Domestic purchases of computers, peripherals, and parts have grown at an annual rate of more than 12 percent from 1993 to 1999, even though the value of domestic production grew on average by only 9 percent over this period. Filling the gap have been imports, which now account for more than 60 percent of the value of new U.S. computer purchases—nearly twice the level in 1987. At the same time, exports represent almost half of U.S. computer production. The United States gains in both directions from this two-way trade in computers and parts. U.S. computer firms can lower their costs by obtaining components from efficient foreign producers, and in turn gain from the ability to sell computers to the larger global market. At the same time, lower prices for computer imports are good for consumers and stimulate investment.

The role of technology in improving economic performance supports the arguments for free trade and economic integration. The worldwide diffusion of technology has the potential to strengthen growth in other countries. This will in turn provide benefits to the United States, including stronger demand for our exports and lower prices for our imports. And just as other countries profit by using U.S. innovations, so too will we benefit from the results of foreigners' inventions. However, barriers to trade—tariffs, non-tariff measures, monopolies, and import discrimination disguised as regulation—reduce the opportunity to compete in markets in which technology and other innovations can be applied. Barriers also hinder the diffusion of technology and best business practices, and thus diminish the benefits of globalization. Therefore, such barriers must be eliminated to foster greater diffusion of technology and strengthen world economic growth.

Globalization offers great potential for raising living standards and the quality of life for both Americans and the global population. But Clinton Administration has also stressed that

making economic integration work means making it work for people. At issue is not whether we should welcome the emergence of a truly global market economy, but instead what kind of global market economy we should work to build.

Creating a Stable Global Economic Environment

We discovered in the United States in the 19th century that the invisible hand of economic integration and markets needs a firm skeleton of rules and institutions to succeed. And we are learning that the same must be true at the global level. It is too easy to frame a false choice as one between unfettered, unregulated global capitalism, on the one hand—and autarky and protectionism on the other. The reality is brighter, but also more complicated. To build a vibrant, more inclusive global economy, there is no alternative to finding some way in between these two extremes. This is first and foremost a challenge for countries. But building the right kind of integrated global economy depends as well on the success of the international community in developing an institutional framework in which global integration can take place.

Globalization has been spurred by the rapid growth of trade and the increased global integration of product markets. But growth in trade has been accompanied and in many cases supported by significant growth in the scale of the global flow of private capital. Access to global capital helps to finance trade. It is a vehicle for the development and transfer of new technology, and a creator of new economic opportunities. But the expansion in the global flows of capital needs to be accompanied by the development of policies and institutions that maximize its potential to finance rapid growth while minimizing the risk of crisis inherent in all financial flows. The increased scale of global flows of capital and the risk that such flows can reverse themselves suddenly has made developing a well-functioning system for ensuring a strong and

stable flow of capital to emerging economies a crucial part of building a successful, truly global, economy.

Both the economic and the humanitarian imperatives of a stronger international financial architecture were brought out clearly in the recent financial crises in Asia and elsewhere. In that period, in very different parts of the world, millions of people who were just going about their business had their lives turned upside down because their countries' financial systems had been thrown into crisis. The international community must work to provide maximum assurance that such crises will be less frequent—and less costly—in the future.

Making crisis less frequent and less costly means having a clear understanding of what has caused them in the past. There is now widespread agreement that the financial crises of 1997-9 were caused by two elements coming together. The first element was weakness in countries' economic fundamentals, including questionable banking systems, domestic credit bubbles supported by large amounts of short-term external debt, unsustainable exchange rates, and in some cases, deteriorating fiscal positions. These weaknesses were coupled with a reassessment by international investors of the capacity of countries under scrutiny to safely absorb foreign capital. And second, an element of panic, whereby the mode of domestic and foreign investors shifted from thinking about the economic health of the countries involved to thinking about who would be the last out.

This understanding of the crisis is increasingly informing the reform of the international financial architecture. This shows itself in three fundamental ways:

- *More effective means of preventing crises.* The International Monetary Fund (IMF) and the international community have strengthened their surveillance of new kinds of risk,

with a new focus on preventing the adoption of policies that create vulnerabilities that augment the risk of financial panic. These include: a revolution in the transparency of national macroeconomic frameworks that will make surprises less likely; the development of a wide-ranging framework of international codes and standards to provide benchmarks for national policies in areas such as bank supervision and securities market regulation; and more systematic incorporation of indicators of liquidity and balance sheet risks in IMF surveillance reports.

- *Safer policies in the emerging market economies.* There are already signs of progress as a result of greater global understanding and surveillance of economic risks. Notable examples include: the ratio of external debt to foreign reserves has more than halved since 1996 in countries that have experienced liquidity crises; short-term debt as a share of total external debt, among the same group of countries, has fallen from 34 percent in 1996 to 18 percent in 1999; and some fourteen countries have moved away from unstable pegged exchange rate systems. But there is a need for constant vigilance.

- *An IMF that is better-equipped for modern crisis response.* With the creation of the Supplemental Reserve Facility and the Contingent Credit Line, and the recent IMF Board agreement on the reform of IMF facilities, the IMF now has tools that are a match for the new kind of crises. These facilities have been designed so that they do not, as far as possible, distort the incentives of investors and governments. The IMF is increasingly oriented toward the provision of short-term, emergency finance, priced to discourage casual use, and encourage rapid repayment. These changes have been accompanied by

efforts to increase the IMF's knowledge of financial markets, to improve communication between borrowing countries and their creditors, and to build on the experience gained in recent cases of debt restructuring so as to more fully operationalize the broad guidelines on private sector involvement in crisis resolution outlined by the G7 countries (the seven countries with the largest economies) earlier this year.

These measures are important steps to ensure a stable international economic environment which fosters growth.

This is especially vital for the poorest of developing countries, since a central lesson of history has been that rapid economic growth is essential to rapid or long-lasting reductions in poverty. But a stable macroeconomic environment by itself is not enough to assure growth. A number of other elements are also crucial. Governments need to put in place institutions and rules that allow markets to function well. They must also make public investments with particularly high social returns, especially girls' education and basic health services, including immunization coverage for all children. And governments need to promote an effective rule of law, through good governance, transparency, and support for the emergence of a healthy civil society.

Economic integration holds out enormous potential for improving the lives of the world's people through increased access to goods, services, and ideas. But for this to happen, globalization must proceed in a stable economic environment, so that it can be harnessed to advance a prosperity that is shared by all.

Challenges in the New Environment

The confluence of increased globalization and improvements in communications and technology have raised U.S. economic performance and contributed to prosperity. But these developments bring with them new challenges. In an age of international economic integration, continued success in the United States requires effective engagement with the global economy, specifically strengthening connections with the rest of the global economy, and building larger markets overseas. For globalization to proceed in a constructive way, there needs to be institutions and policies that guard against its risks. These include:

- international financial institutions that are transparent, accountable, and effective in a world where cross-border capital flows are overwhelmingly private;
- increased provision of global public goods in areas such as the environment and infectious disease;
- easing integration of heavily indebted poor countries into the global economy by offering debt relief to countries serious about undertaking economic reform; and
- strengthened efforts to combat financial abuse, including money laundering and corruption.

Successful globalization requires a parallel international process of harmonization of rules, including rules governing the financial system, an effort that has been going on largely silently for many years in the central banking community (e.g., revision underway of the Basel capital accord of 1988). More recently, in the wake of the Mexican and Asian financial crises of the 1990s, this harmonization process has accelerated (notably with a focus on the role of international standards and codes in the international financial architecture discussion).

In the United States, while healthy growth and low inflation continue, higher U.S. personal saving would be desirable to sustain the investment that has contributed to rising income and employment. An avenue for this to occur is through stronger growth abroad among U.S. trading partners. Major economies need to ensure sustained, balanced global growth by maintaining supportive fiscal and monetary policies, pushing ahead with structural reforms to remove barriers to investment opportunities (including opportunities with respect to new technologies), and, in Japan, continuing to strengthen the financial system. Emerging market economies have seen recovery take hold and have taken important steps to reduce their vulnerabilities. But further progress is needed, including on financial sector restructuring and other reforms.

The global imperative to combat poverty and support economic development in the poorest countries gains added urgency today, when HIV/AIDS, conflict, and other catastrophes threaten to reverse years of gains in many countries. The divergence in national incomes between the developed and developing world is not because so many countries are effectively integrating themselves with the global economy. It is because so many countries are not. A challenge for economic development thus remains how to bridge this gap, even when the emergence of new technologies threatens to create an international "digital divide" parallel to that in economic development.

At home, technology and globalization provide benefits, but also lead to dislocations that could be softened by the appropriate policy response. And technology provides new challenges for international legal frameworks. These include the possible use of technology for criminal activity, new issues that arise in taxation in an increasingly globalized economy, and the

protection of the rights to intellectual property generated by innovation. These challenges and the policy responses of the Administration are discussed below.

Developments in the U.S. Trade Balance and Current Account

The rapid growth in investment and resulting strong performance of the U.S. economy has contributed to an increase in the trade deficit. Robust income growth and increased wealth from rising asset prices has translated into rapid growth in imports. Slower growth in the rest of the world in 1998 and part of 1999, notably in major U.S. trading partners in Europe and Asia, led to weaker import demand in those regions and slower U.S. exports (Chart 4-3). The strength of the dollar, reflecting in part capital inflows stemming from the desire of foreigners to participate in attractive investment opportunities in the United States, has also contributed to the increased trade deficit by lowering the price of U.S. imports relative to domestic products. Through the first half of 2000, the trade balance in goods and services was in deficit at a rate equal to an annual amount of roughly $360 billion, equivalent to 3.7 percent of GDP (Chart 4-4). The current account balance (a comprehensive measure that comprises not only the trade balance in goods and services but also net income and transfers), was a deficit of roughly 4.2 percent of GDP (Chart 4-5).

As an accounting identity, the current account balance equals the difference between national saving and national investment. A deficit reflects an excess of investment over domestic saving, and thus an inflow of foreign capital that makes up for the shortfall. The widened current account deficit reflects rising net national investment, which grew as a share of gross domestic product (GDP) by 4.4 percentage points from 1992 to the first half of 2000 (from