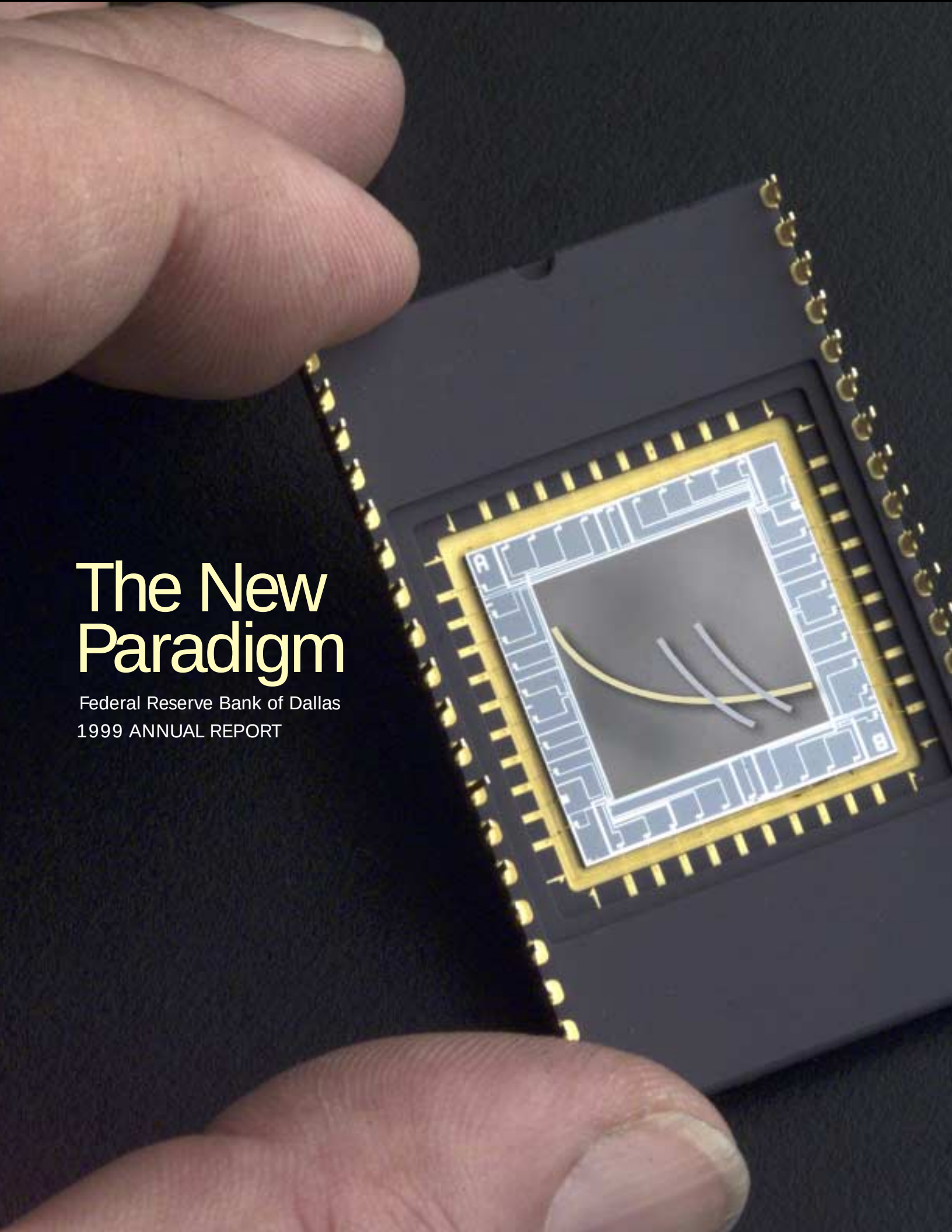


The New Paradigm

Federal Reserve Bank of Dallas
1999 ANNUAL REPORT

Contents

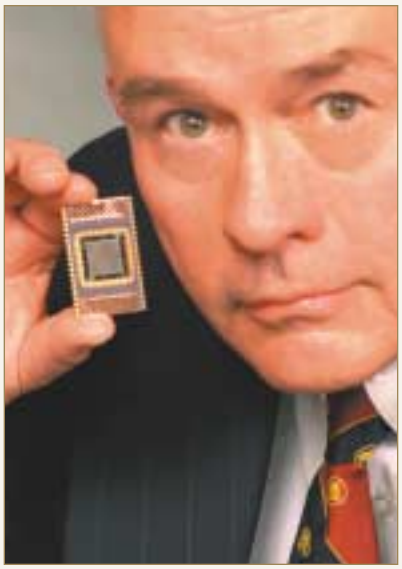
Cover: The delta-doped charged coupling device for UV imaging and low-energy particle detection was developed by the Micro Devices Laboratory of the Jet Propulsion Laboratory, NASA. It is used for astronomy and medical imaging applications.

Out on a New-Paradigm Limb

"Paradigm" is a pretty fancy word for a country boy. My understanding of it is illustrated by the familiar recipe for boiling a frog. You don't boil a frog by dropping him into boiling water. He'll jump out. Instead, you drop him in cold water and raise the heat. The frog won't jump because he doesn't realize his paradigm is shifting.

I believe our economy's paradigm has been shifting. But like the frog, many of us haven't noticed because the change has been gradual. Some attribute its improvement to good luck and temporary factors, or "positive supply shocks" in economists' jargon. We have been lucky, and some of our good fortune has been based on temporary factors. But we at the Dallas Fed believe there's more to it than that—a lot more.

We believe once-in-a-century advances in technology are transforming our economy. The computer chip is doing for today's knowledge economy what electricity did for our industrial economy a century ago. Synergies in technology are driving an acceleration in productivity growth that enables us to grow faster with less inflation. Economic progress is speeding up; the speed limit is rising.



Technology is the main force driving the New Economy, but not the only one. Deregulation of key industries is a factor. Increased worldwide competition is another. The collapse of communism and hard-core socialism is part of the mix, along with the fall of the Iron Curtain in Europe and the protectionism curtain in Latin America and elsewhere. Freer trade and investment throughout the world are factors. Efficient U.S. capital markets and the unique venture capital system serving high tech are important. So is the switch from budget deficits to surpluses.

The Fed has done its part by reducing inflation. In the inflationary environment of the 1970s, squeezed profits could be restored by raising prices, with confidence that competitors would go along. Today's disinflationary environment shifts the burden to productivity-enhancing cost cutting as the main route to higher profits.

While many factors are important to the New Economy, our essay focuses on technology. It helps answer the skeptics who find nothing new in the New Economy.

I'm on record saying the Internet changes everything. I may exaggerate. "Things are different this time" are infamous last words that put me out on a limb. So be it. The greater exaggeration is to say nothing has changed, except, perhaps, some of the old economy's parameters.

We've been growing faster than potential and sustaining the unsustainable for four years and counting.

1999 was another good year for new-paradigm optimists. Real GDP grew over 4 percent. Payroll employment increased by 2.7 million workers, or 2.1 percent. Unemployment fell to 4.1 percent. And core inflation continued to decline, to 2 percent or below, depending on the measure. The year ended with the expansion poised to become America's longest.

Real GDP growth has averaged 4 percent for the past four years, with declining inflation. This almost doubles the 2 percent to 2.5 percent not long ago considered the maximum noninflationary potential. But we've been growing faster than potential and sustaining the

unsustainable for four years and counting. Sounds odd, doesn't it? Our faster output growth is based primarily on faster productivity growth and secondarily on faster labor force growth.

Productivity growth, or increases in output per hour worked, is the main source of rising living standards. It's nice to have more output based on more workers and more hours worked, but more output per hour worked is what raises per capita incomes and living standards. Productivity growth slowed dramatically in the early 1970s, and for two decades thereafter it grew just over 1 percent a year. With the number of hours worked also growing just over 1 percent, the potential noninflationary growth rate—the speed limit—was thought to top out around 2.5 percent.

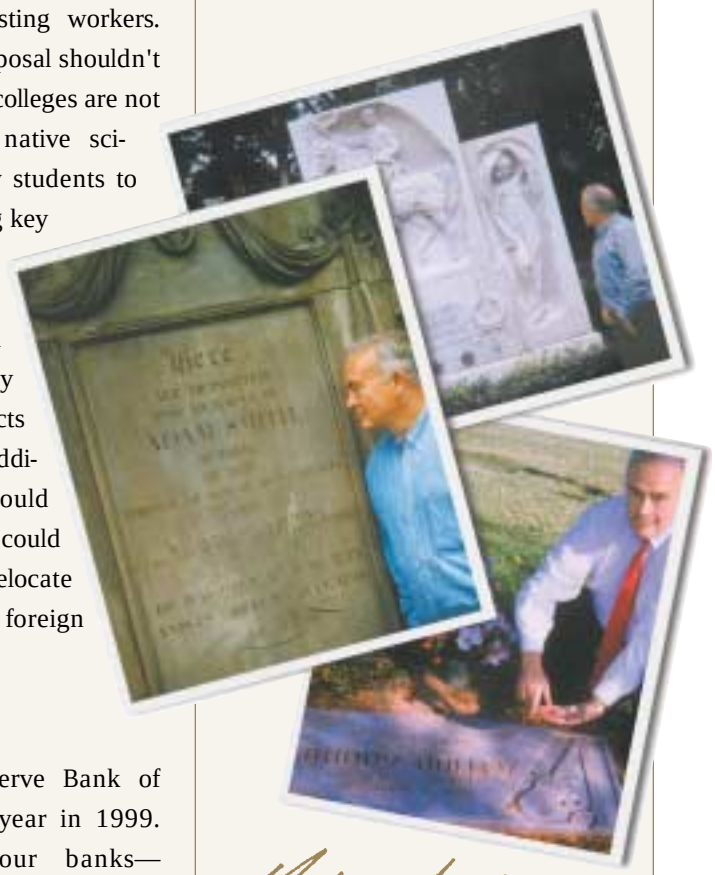
The decline in productivity growth reversed in the 1990s, especially in the second half. Productivity growth now appears to be at least 2.5 percent and rising. An increase from 1 percent to 2.5 percent is an increase of 150 percent, a huge jump with profound implications if sustained. Last year was encouraging. Productivity rose over 3 percent for the year and over 5 percent in the second half.

In addition to faster productivity growth, faster labor force growth has also boosted the economy. This was accomplished by drawing down the pool of unemployed labor, as evidenced by the decline in the unemployment rate. I mentioned in last year's Annual Report that it will be difficult to sustain recent growth rates with this shrinking labor pool, and I made two modest suggestions for alleviating the shortage: remove the penalty for Social Security recipients who work, and increase the number of visas for the skilled workers our high-tech sector requires. The need is even greater a year later, making these reforms more urgent.

Given today's squeaky-tight labor markets, neither of these proposals should threaten existing workers. The immigration proposal shouldn't be a threat since our colleges are not graduating enough native science and technology students to meet demand. Filling key slots with foreign workers would likely increase the demand for U.S. workers by allowing stalled projects to go forward. In addition, Americans would benefit if U.S. firms could stay put rather than relocate abroad to employ foreign workers.

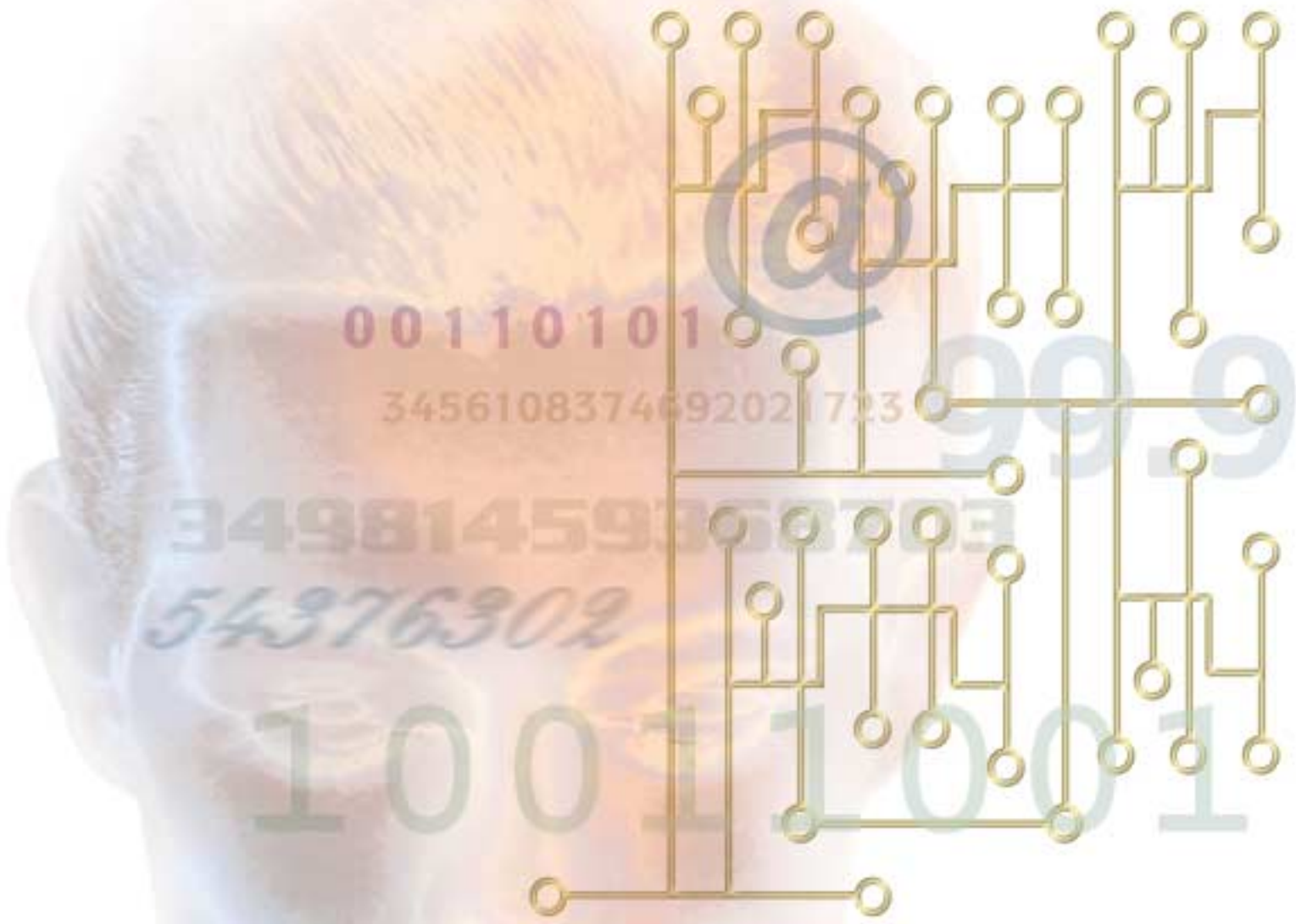
The Federal Reserve Bank of Dallas had a good year in 1999. We—along with our banks—squashed the Y2K bug. We provided more services with improved efficiency. The District's economy remained strong, and our banks remained profitable and well capitalized. A good time—as they say—was had by all.

On a personal note, I, too, had a good year. Highlights included my first visit to "Austin City Limits" and to the Grand Ole Opry and the Bluebird Cafe in Nashville. At the Bluebird, the man who wrote one of my favorite songs, "Bubba Hyde," sang it for me. I made pilgrimages to Adam Smith's grave in Scotland, Buddy Holly's in Lubbock and Sam Houston's in Huntsville. 1999 will be a hard year to top.



Bob McTeer

Robert D. McTeer, Jr.
President



The New Paradigm

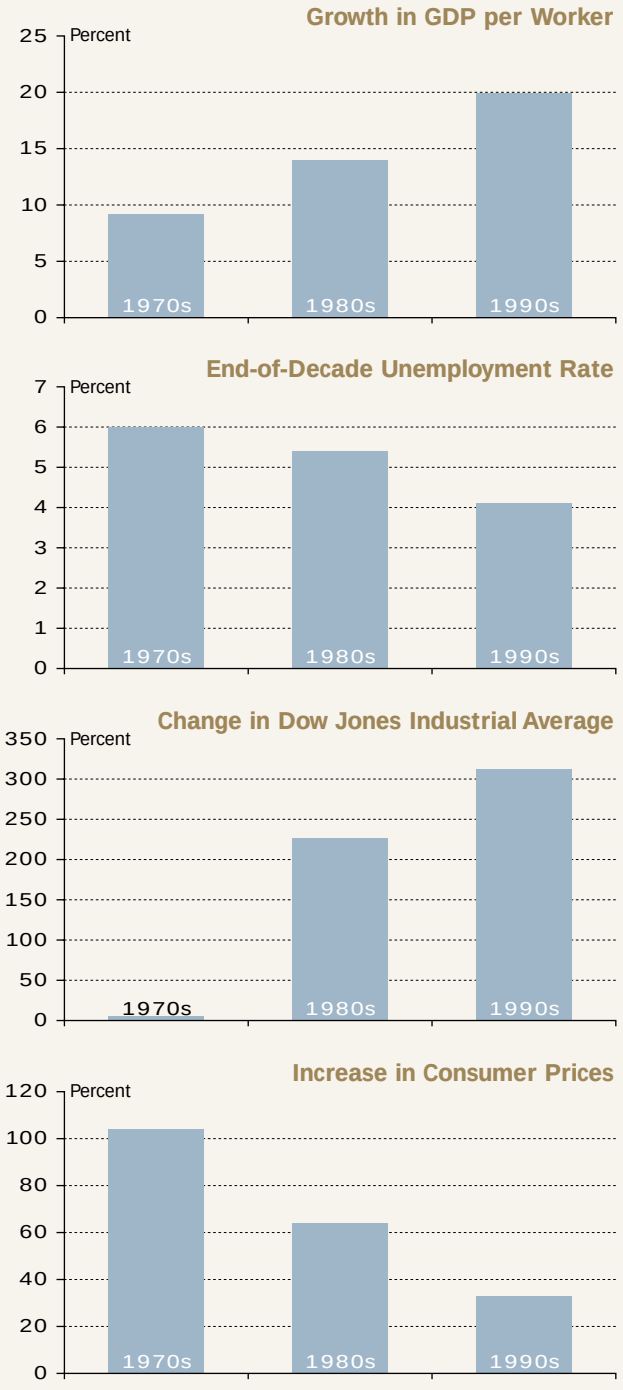
The United States entered the 21st century with its economy on a roll. GDP growth averaged more than 3 percent a year in the 1990s. The country created 17 million jobs, driving unemployment down to a 30-year low of 4.1 percent. Recession receded into memory—only eight months in the previous 17 years.[1] As productivity surged, Wall Street gave the economy rave reviews and the Dow Jones industrial average quadrupled over the decade.

Through it all, one feature of the economic mix remained somewhat surprising. Rather than rising, inflation fell in the booming 1990s. Consumer prices rose 5 percent per year at the start of the decade but less than 2 percent a year from 1996 on. *(See Exhibit 1 on page 4.)*

Exhibit 1

The U.S. Economy: Gaining Momentum in the '90s

By virtually any measure—GDP growth, unemployment, national wealth, inflation and more—the U.S. economy performed better in the '90s than it had in decades. Some say the good times can't continue. But a deluge of new technologies and industries made possible by the microprocessor has only begun to reshape the economy.



Times this good defy traditional economic analysis. For at least the past five decades, conventional wisdom held that a free market economy couldn't long sustain strong growth, a low jobless rate and stable prices. Economists emphasized trade-offs—between unemployment and inflation, between price stability and growth.

When the economy started to percolate, the thinking went, surging demand would create supply bottlenecks and rising wages would ignite inflationary pressures. Indeed, economic orthodoxy fixated on a "natural rate" of unemployment—somewhere between 5.5 percent and 6.5 percent—below which the economy couldn't go without escalating inflation. Once the inflationary genie was out of the bottle, the remedy was to brake the economy, which meant fewer new jobs and more layoffs. The dismal science reached another dismal judgment: good times can't last because prosperity sows the seeds of its own demise. To avoid ruinous cycles of boom and bust, the best a mature economy can do is plod along at a growth rate of 2.5 percent a year.

Traditional theories are at a loss to explain the 1990s. They miss the mark because of sweeping changes in the U.S. economy. Over the past two decades, a new economy has emerged from a spurt of invention and innovation, led by the microprocessor. These thumbnail-size devices serve as the "brains" for computers and thousands of other products, some as cutting edge as Doppler radar, others as mundane as a musical birthday card. The microprocessor's ability to manipulate, store and move vast amounts of information shifted the economy's center of gravity, creating the era of smaller, faster, smarter, better, cheaper.

The microprocessor's myriad spillovers magnify its impact. The microchip ignited wave after wave of invention and innovation. New technologies and new products burst forth, a modern-day alchemy spinning silicon into gold. The microprocessor and its spillovers forged an Information Age infrastructure of ever more powerful and affordable computers, increasingly complex software, data-dense fiber-optic networks, cellular telephones, satellite communications, laser scanners and the ubiquitous Internet.

What's different about the New Economy? There's an unbridled dynamism, flowing from an entrepreneurial cap-

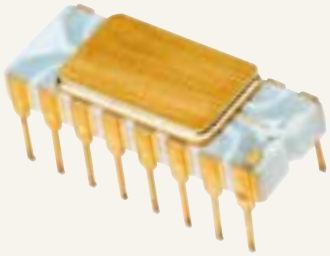
Exhibit 2

Technology Spillovers: Increasing Returns and Decreasing Costs

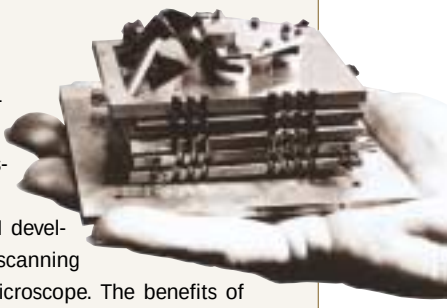
Even when individual industries face decreasing returns to scale, the economy as a whole may enjoy increasing returns when technology spillovers from one industry benefit others.

Technology spillovers are especially abundant with mother lode inventions, whose applications spread far and wide. Innovation in one company—though intended solely for internal benefit—can spark innovation in others, triggering a powerful, economy-wide cascading effect not unlike alchemy. Revolutionary technologies can take decades to spawn all their spillovers, during which, for all practical purposes, aggregate returns to scale increase.

■ Texas Instruments was trying to reduce the size of electronic circuitry when engineer Jack Kilby developed the integrated circuit in 1958. The benefits of that innovation far exceeded what TI could internalize, opening a whole new science in which electronic circuitry would shrink to sizes once thought unachievable.



■ Intel was pursuing circuitry small enough for a pocket calculator when Ted Hoff developed the silicon-etching process that ultimately led to the microprocessor. A 1971 ad in *Electronic News* heralded the "computer on a chip" and signaled the start of the digital age.



■ In seeking to make microprocessors ever smaller, IBM developed the scanning tunneling microscope. The benefits of that research, however, went far beyond what was envisioned. The microscope enabled an entirely new industry—nanotechnology—that promises to deliver molecularly engineered materials that will reshape our world.

Economist Joseph Schumpeter clearly understood the economics of spillovers:

"Most of us seem here to commit a mistake in handling the concept of decreasing returns. In its proper sense it applies only to given production functions and generally stationary conditions."

—*Business Cycles*, Vol. 2

"Whenever...a given quantity of output costs less to produce than...before, we may be sure...that there has been innovation somewhere. It need not necessarily have occurred in the industry under observation, which may be only applying, or benefitting from, an innovation that has occurred in another."

—*Business Cycles*, Vol. 1

"We are just now in the down grade of a wave of enterprise that created the electrical power plant, the electrical industry, the electrified farm and the motorcar....The mere utilization of the achievement of the age of electricity...would suffice to provide investment opportunities for quite a time to come."

—*Capitalism, Socialism, and Democracy*

italism. A novel idea and a little money can spark a billion-dollar business almost overnight. Yesterday's economy was dominated by establishment capitalism, with high barriers to entry that disadvantaged newcomers and new products. Economic change occurred at a slower pace.

In the New Economy, knowledge is more important to economic success than money or machinery. Modern tools facilitate the application of brainpower, not muscle or machine power, opening all sectors of the economy to productivity gains. The Industrial Age ran on physical plant and equipment. Rapid productivity growth was the province of manufacturing, a shrinking segment of the economy for four decades.

Scarcity, the first assumption of the old economy, isn't the dominant feature of the New Economy. Many of today's markets are awash with goods and services. Sellers compete aggressively for buyers. They discount. They cut costs. They expand markets through relentless promotion and advertising.

Increasing returns to scale pervade the New Economy. More of today's companies and industries thrive on quantity discounts—the higher the demand, the lower the price. Decreasing returns to scale dominated the old economy, so producing more goods and services pushed prices up. *(See Exhibit 2.)*

Roughly 1.3 million Americans work in the cell phone industry—making the phones and their components, handling services and sales, and doing other jobs. Without the chip, this industry and many others wouldn't exist.

The most far-reaching implication of the New Economy centers on the trade-off between growth and inflation. Now, unemployment can go lower and growth higher without igniting inflation. Policymakers working under yesterday's mind-set had to be vigilant about growth and job creation, reacting quickly to slow the economy before prices spiraled out of control.

The New Economy is a controversial concept, still being shaped by debates over its import and implications. That's not surprising, because adjusting to changes in economic fundamentals takes time. The United States has passed through several economic eras. We began as an agricultural society. After the mid-19th century, the steam engine and then electricity transformed the country into an industrial nation. Today, deep into the Information Age, old economic theories fail to explain new realities and policy signposts don't mean what they once did.

The challenge lies in adjusting our thinking to the new realities.

The Microprocessor Miracle

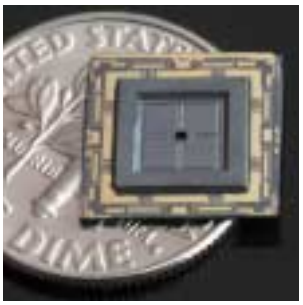
Until the 1990s, contemporary Americans considered the 1960s the quintessential good times because the United States enjoyed uninterrupted growth for almost nine years.[2] The 1960s, however, don't provide the best corollary for what's happening in today's economy. We need to travel further back in time.

From 1895 to 1915, a great burst of inventiveness ushered in an era of rapid technological change and economic growth. Americans saw the arrival of one marvel after another—automobiles, airplanes, telephones, phonographs, radios, elevators, refrigeration and much more. These new inventions barely registered as a blip in a GDP dominated by farming, shopkeeping and small-scale production. In time, though, the industries that grew out of them formed the economic backbone of the 20th century.

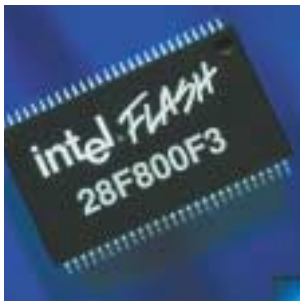
The advances of this long-ago era would have been impossible without a technology that arrived just after the Civil War: electricity. Thomas Edison, the greatest of American inventors, created the lightbulb in 1879 for the simple task of illuminating a room. To build a market for his invention, Edison harnessed electricity, building the world's first generating plant and distribution network in New York City. As it spread through the economy, electricity recast the economic paradigm.

Edison, without intending anything more than turning night into day, triggered a revolution. Without electricity, there would be no spark for internal combustion engines, no power for telephones, radios, refrigerators and air conditioners. Electricity provided an ever-ready energy source for factories, with mass production driving down the cost of making just about everything. Without it, we'd still rely on muscles, steam and wind, rather than electric motors and gasoline engines. We'd still be living in a world of horse-drawn carriages, candles, ice houses and cottage industries.

Like electricity, the microprocessor is an important invention in its own right and one that shook the world as it touched off a rapid-fire proliferation of spillovers. The device traces its origins to Dallas, where in 1958 Jack Kilby of Texas Instruments fashioned the first integrated circuit, a bundle of transistors on a piece of silicon. Thus began the grand theme of modern electronics—ever smaller, ever more powerful. Thirteen years later, Ted Hoff of Intel



a. Microgyro chip: navigation, orientation



b. Flash chip: television, data conversion

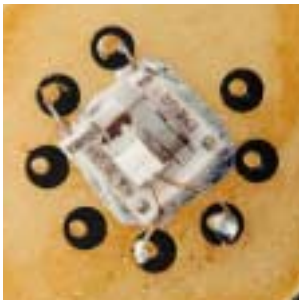
c. Pentium III chip: computing, speech recognition, audio streaming

d. DLP chip: movie and video projection, photo finishing

e. DSP chip: cellular telephony, controlled braking, network connection

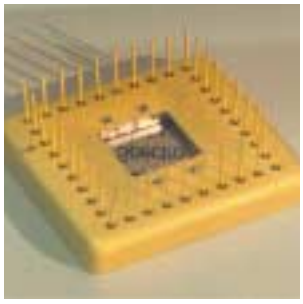
f. StrongARM chip: printing, scanning, portable computing

g. Camcorder chips: personal video recording

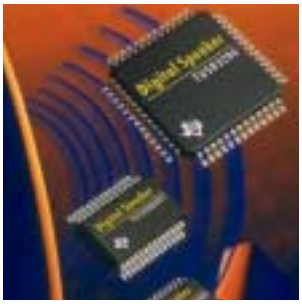


h. Hygrometer chip: measuring moisture

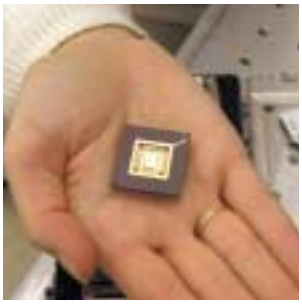
i. Diode laser chip: environmental monitoring, medical diagnosis, communication



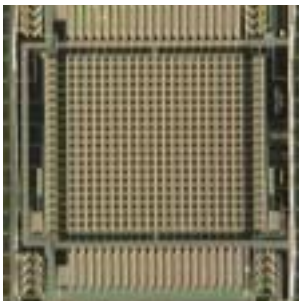
j. Delta-doped CCD chip: medical imaging, measuring solar wind, monitoring industrial waste



k. Digital speaker chip: audio conferencing, portable audio



l. Active pixel sensor chip: X-ray imaging, bone density and body scanning



m. Biochip: genomics research, genetic testing, drug discovery

n. Camera chip: traffic monitoring, video conferencing, security evaluation

o. Ibutton chip: bar coding, delivery tracking, asset tagging, temperature sensing

p. Doppler radar chips: monitoring weather, wind shear detection

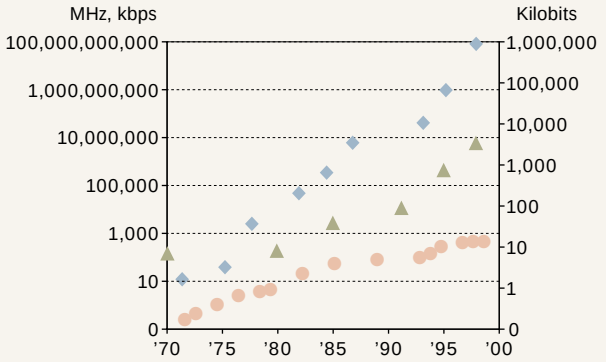
Exhibit 3

Knowledge Is Power

Advances in the ability to process, store and send information have thrust America headlong into the Information Age. In just three decades, processing power, storage capacity and transmission speed (bandwidth) have multiplied by tens to hundreds of thousands. With capabilities soaring and costs falling to just pennies, information is becoming ubiquitous and the power of knowledge plentiful.

a. Processing, Storing and Sending Information

	'70	'80	'90	'99
Microprocessor speed (MHz)	.11	8	50	800
DRAM storage (kilobits)	4	64	4,000	1,000,000
Bandwidth (kilobits per second)	50	56	46,080	9,600,000



b. The Price of Power and Speed

	'70	'80	'90	'99
Cost of 1 MHz	$7,600.82	$103.40	$25.47	$.17
Cost of 1 megabit storage	$5,256.90	$614.40	$7.85	$.17
Cost of sending 1 trillion bits	$150,000.00	$129,166.67	$90.42	$.12

developed the silicon-etching process that produced the first true microprocessors. Initial applications centered on number crunching and rapid data entry. Handheld calculators arrived in 1972, bar code scanners in 1974 and the personal computer in 1975.

Over the next decade or so, American industry applied microprocessors to other tasks. Whole new products, progeny of the digital electronic revolution, burst onto the marketplace—cellular telephones, robotic factory hands, air traffic control systems, global positioning satellites, laser surgery tools, camcorders, palm-size personal organizers, to name a few.

Microprocessors made existing products better, cheaper and more efficient. Starting in the early 1980s, "smart" features helped fine-tune televisions, cut energy use by refrigerators, control cooking in microwave ovens, memorize program schedules in VCRs and generate diagnostic reports for automobiles.

As microprocessors grew in power, computers could handle larger, more complex tasks. The emerging science of computational biology illustrates how computers can spur progress in unexpected areas. New programs allow researchers to quickly decipher genetic code, speeding up development of new drugs and improved plants. Away from the laboratory, new programs open a world of possibilities—from the monsters that inhabit video games to computer-aided design for cars, clothing and houses. Using desktops and laptops, Americans run small businesses, publish newsletters and keep tabs on family finances.

A third round of spillovers emerged as computers began to communicate with each other, moving data quickly and inexpensively. Universities were the first to hook computers into networks, but it wasn't long before everyday Americans began to connect via electronic mail. The Internet entered the 1990s as an obscure communications network for educators and scientists. It ended the decade as the library, shopping mall and playground of the masses. The Internet is creating spillovers of its own, making existing industries more efficient and spawning entirely new ones, including web page design and Internet service.

The microprocessor miracle, including its wave of spillovers, wouldn't have been as spectacular if computing technology hadn't improved at such a rapid clip. Technical types chart the progress in terms of megahertz. For the rest of us, it's enough to know that processing power leapt 7,000-fold in three decades. Number-crunching tasks that took a week in the early 1970s now require but a minute. *(See Exhibit 3a.)*

Data storage capacity and transmission speeds surged right along with the more powerful microprocessors. A single memory chip now holds 250,000 times as much data as one from the early 1970s—the difference between one page of text and 1,600 books. Transmission speeds increased by a factor of nearly 200,000. Sending the 32-volume *Encyclopaedia Britannica* on the Internet from New

Exhibit 4

16 Stats on the New Economy

Everywhere around us, we can see an economic revolution under way. How we work, live, learn, communicate, shop and invest, what we consume, value and know—all reveal an economy vastly different from that just 30 years ago.

	'70	'80	'90	'99
1 U.S. households with computers	0%	< 1%	22%	53%
2 U.S. shipments of personal computers	0	490,000	9 million	43 million
3 Computer programmers, operators and scientists in the U.S.	284,271	1.1 million	2.0 million	2.5 million
4 Computer and information sciences degrees conferred in the U.S.	4,104	15,041	37,700	35,116
5 U.S. manufacturers of computers and related devices	1,408	2,564	3,894	4,212
6 Market value of publicly traded U.S. computer and related devices companies	$43 billion	$47 billion	$57 billion	$415 billion
7 U.S. computer-services establishments	n/a	26,370	78,788	211,323
8 Market value of publicly traded U.S. computer-services companies	$166 billion	$91 billion	$106 billion	$416 billion
9 Number of PC software programs	0	n/a	n/a	250,000
10 Sales of U.S. software companies	$1 billion	$4 billion	$63 billion	$141 billion
11 Market value of publicly traded U.S. software companies	$1 billion	$6 billion	$33 billion	$440 billion
12 U.S. households on the Internet	0%	0%	0%	38%
13 Worldwide Internet hosts	13	213	313,000	56 million
14 Market value of publicly traded U.S. Internet equipment and services companies	$0	$1 billion	$5 billion	$138 billion
15 Worldwide e-commerce revenues	$0	$0	$0	$151 billion
16 Worldwide e-mail addresses	0	n/a	n/a	263 million

York to San Francisco would have taken 97 minutes in 1970. Today's trunk lines can move the equivalent of eight full sets in just one second.

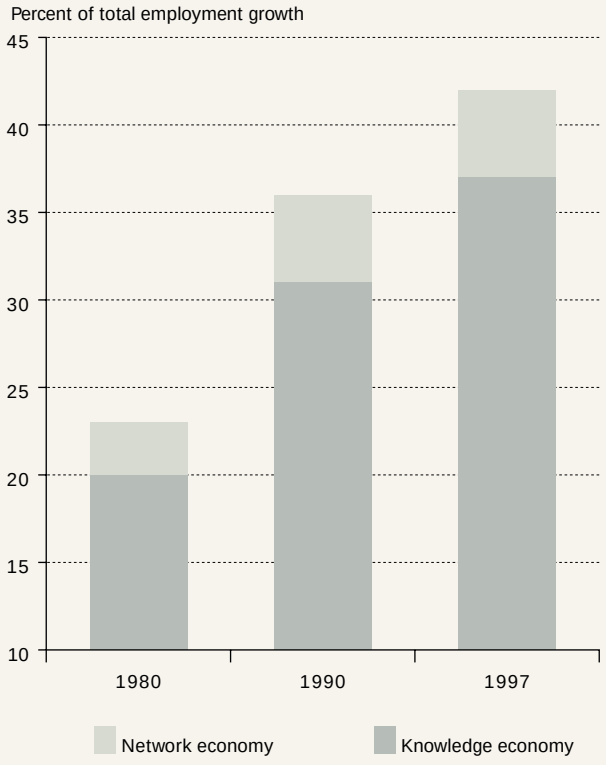
Great leaps of power, capacity and speed led to even greater reductions in the cost of managing information. *(See Exhibit 3b.)* Intel's vintage-1970 chips sold for $7,600 per megahertz. Today's Pentium III chip supplies its computing power for 17¢ per megahertz. The cost of storing one megabit of information—enough for a 320-page book—fell from $5,257 in 1975 to 17¢ in 1999. Sending the *Encyclopaedia Britannica* coast to coast would have cost $187 in 1970, largely because of slow data-transmission speeds and the expense of a long-distance telephone call. Today, the entire Library of Congress could move across the nation on fiber-optic networks for just $40.

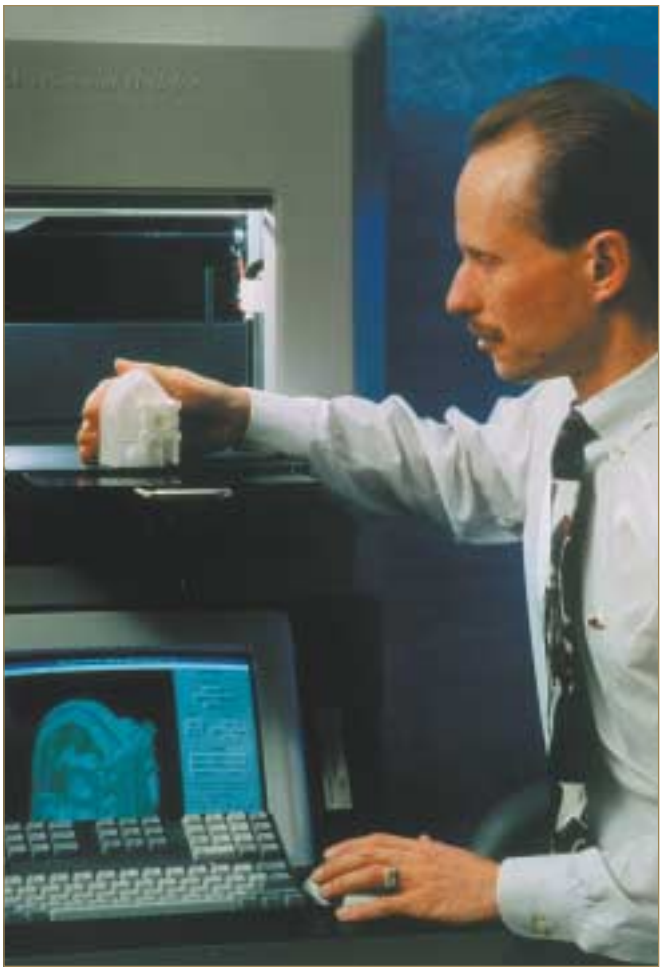
As the new technology became better and cheaper, American businesses and households embraced it. Only a few thousand homes had a PC in 1980. Now, more than half of U.S. families own computers, the newest of them 200 times more powerful than IBM's first PC, introduced in 1981. Two-fifths of households are connected to the Internet, a mode of instant communication scarcely heard of at the start of the 1990s. Americans bought $141 billion worth of software in 1998. *(See Exhibit 4.)*

Exhibit 5

America's Shifting Source of Growth

Data on GDP at the detailed industry level are not available. Employment data, however, reveal a clear shift away from yesterday's commodity-based economic growth and toward knowledge- and network-based expansion. More than 40 percent of employment growth in the '90s came from New Economy industries—double that of the 1970s.





Prototyping each part of a car once took weeks and cost $20,000 on average. Using an advanced 3-D object printer, Ford has cut the time to just hours and the cost to less than $20.

The Information Age's invention, innovation and enterprise forged the New Economy. Many of the nation's high-growth industries wouldn't exist without the microprocessor. High technology now drives the economy. It accounted for more than 40 percent of job growth in the 1990s—double the rate of the 1970s. *(See Exhibit 5.)*

At the end of the '90s, high tech, telecommunications and health care—the prime beneficiaries of the microprocessor revolution—made up more than half the market capitalization of America's 500 largest companies. Three decades ago, high tech still hadn't come out of the geeks' garages, and manufacturing and energy accounted for about half the market capitalization. *(See Exhibit 6.)* While the Dow quadrupled, technology stocks jumped 13-fold in the 1990s, another sign of invention and innovation's growing importance in the economy.

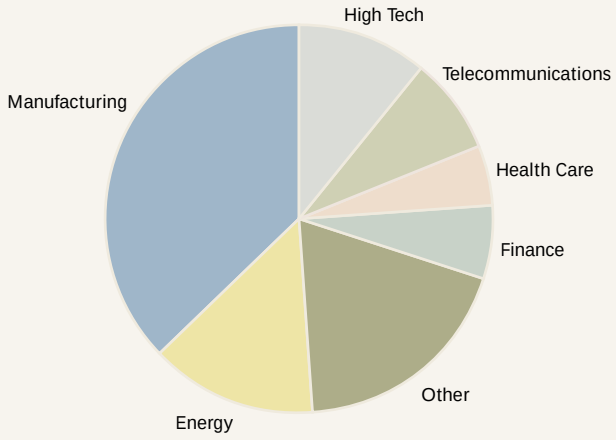
The microprocessor arrived a generation ago, then began revitalizing American industry in the early 1980s. Few understood how much the world was changing until the 1990s, when the Information Age achieved a kind of critical mass. It takes time for an invention to spread through the economy, for spillovers to emerge and for new products to reach the marketplace. Now that it's all coming together, America has new reason to stop seeing itself through a lens of downsizing, inequality and falling living standards. In the 1990s, thanks largely to the microprocessor and its spillovers, America witnessed a resurgence of economic growth, new jobs and productivity.

Exhibit 6

The Shifting Values of American Business

Recognizing the new economic paradigm, the market value of America's businesses has shifted dramatically over the past few decades. In 1970, the manufacturing and energy sectors comprised more than half the value of the top 500 businesses. Today, knowledge is king, with high tech, telecommunications and health care comprising 53 percent. Only four of 1970's top dozen companies make the list today. Three of them—Microsoft, Cisco Systems and America Online—didn't even exist in 1970.

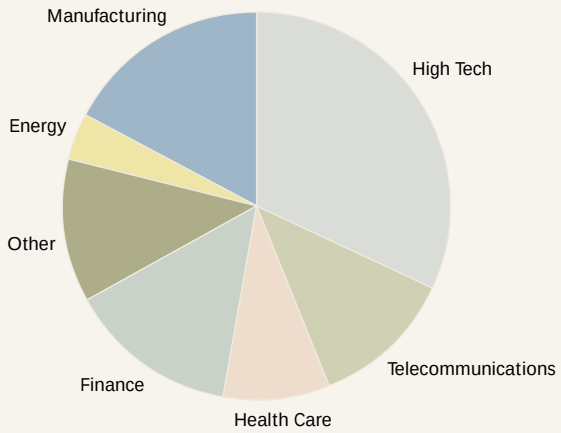
1970
Market Capitalization



The Defining Dozen

1. IBM
2. AT&T
3. General Motors
4. Standard Oil
5. Sears, Roebuck
6. Eastman Kodak
7. Texaco
8. General Electric
9. Xerox
10. Gulf
11. DuPont
12. Ford

1999
Market Capitalization



The Defining Dozen

1. Microsoft
2. General Electric
3. Cisco Systems
4. Exxon Mobil
5. Wal-Mart
6. Lucent Technologies
7. Intel
8. IBM
9. SBC Communications
10. AT&T
11. Citigroup
12. America Online

The Cost Revolution

The payoffs from the microprocessor and its spillovers are part of daily life for just about every American. Yet their mere existence doesn't fully explain the advent of the New Economy, especially the unexpected coupling of lower inflation and faster growth. Today's technologies force us to revise the rules, not only because they spur new industries but also because they embody a sweeping capacity to lower the cost of producing goods and services.

Technology impacts prices in several ways. Direct costs fall as Information Age tools make it cheaper to produce goods and services. Other savings come through electronic commerce, which encourages lower prices by expanding markets and increasing competition. Most important, the microprocessor and its spillovers transform the structure of long-term average costs, not just for New Economy enterprises but for the nation as a whole.

Direct costs. Corporate America invests heavily in computers, shelling out hundreds of billions of dollars in the 1990s for PCs, servers, software and peripherals. The investment pays off as computers boost the speed, accuracy and efficiency of just about everything businesses do—from the design studio to the factory floor, from the checkout counter to the accounting department. Information systems shorten supply chains, allowing timely delivery and automated reordering that slash inventory and paperwork costs.

Exhibit 7

A Compendium of Cost Cutting

Telecommuting

The ability to work productively at home has jumped, thanks to the spread of personal computers, e-mail, fax machines, cell phones and the Internet. Roughly 30 million adults currently use the Internet at home for business purposes. The proportion of workers with flexible schedules has risen sharply, from just 15 percent in 1991 (when the World Wide Web was introduced) to nearly 30 percent today. Roughly 20 million Americans now telecommute, working at least one day per month from home during normal business hours. Studies show that telecommuting saves businesses roughly $10,000 annually for a worker earning $44,000—a savings in lost work time and employee retention costs, plus gains in worker productivity. By freeing us from the 8-to-5 company office so we can work when and where we do it best, technology has cut the cost of getting the job done nearly a quarter.

Laparoscopic Surgery

Approximately 600,000 people in America had their gallbladders removed last year, 95 percent of them with a new technique known as laparoscopic cholecystectomy. The procedure uses a smart surgical tool known as a laparoscope—consisting of a digital camera (advanced models containing three or more chips), fiber-optic cables and a video monitor—and requires only three or four $1/3$-inch incisions. Patients can resume normal activities in just one week, compared with six weeks or more with yesterday's highly invasive surgery. The 85 percent reduction in lost work time isn't the only savings. The procedure itself costs roughly 10 percent less in hospital and physician fees. Similar savings apply to laparoscopic procedures involving the stomach, appendix, esophagus, abdomen, colon and other organs.

Precision Farming

With precision farming technology, remote sensors on harvesters linked to GPS satellites enable growers to make straighter rows, reduce swath overlap and crop compaction, operate in low-visibility conditions (even at night) and increase field production with reduced operator time. And whereas traditional soil testing occurs every $2\,1/2$ acres, new digital mapping software computes crop yields every few feet, so growers can zero in on specific areas where yields are down. Soil-testing costs fall from roughly $50 per sample using old methods to under $8; yields are up; farmers can segregate their harvests into, say, $15-a-bottle and $30-a-bottle grapes; and trucks can be packed more accurately to avoid fines for overloading and the inefficiencies of underfilling.

Smart Structures

Monitoring and maintaining the soundness of dams, bridges, buildings and tunnels can be expensive. According to the Federal Highway Administration, 42 percent of the nation's 578,000 highway bridges are seriously deteriorated. The current way to keep tabs on the structures' health is to periodically drill holes in each one and analyze its core sample—a labor-intensive proposition. But by equipping them with a fiber-optic "nervous system," data can be collected continuously on structure strain, temperature, vibration, magnetic fields, cracks, and road-salt corrosion and penetration. That's exactly what's been done in Vermont, where engineers have made the Waterbury bridge the smartest in the world. What's more, embedded in a new dam spanning Vermont's Winooski River are four miles of fiber-optic cables. Although there to monitor stresses and strains, the cables provided an added bonus when spectrum readings from one turbine showed an unpredicted vibration, indicating efficiency had dropped from 92 percent to 81 percent. Out-of-round gears were identified and replaced, saving a significant amount of revenue. Applied to the nation's entire infrastructure, the cost efficiencies from smart structures promise to be enormous.

Lumber Manufacturing

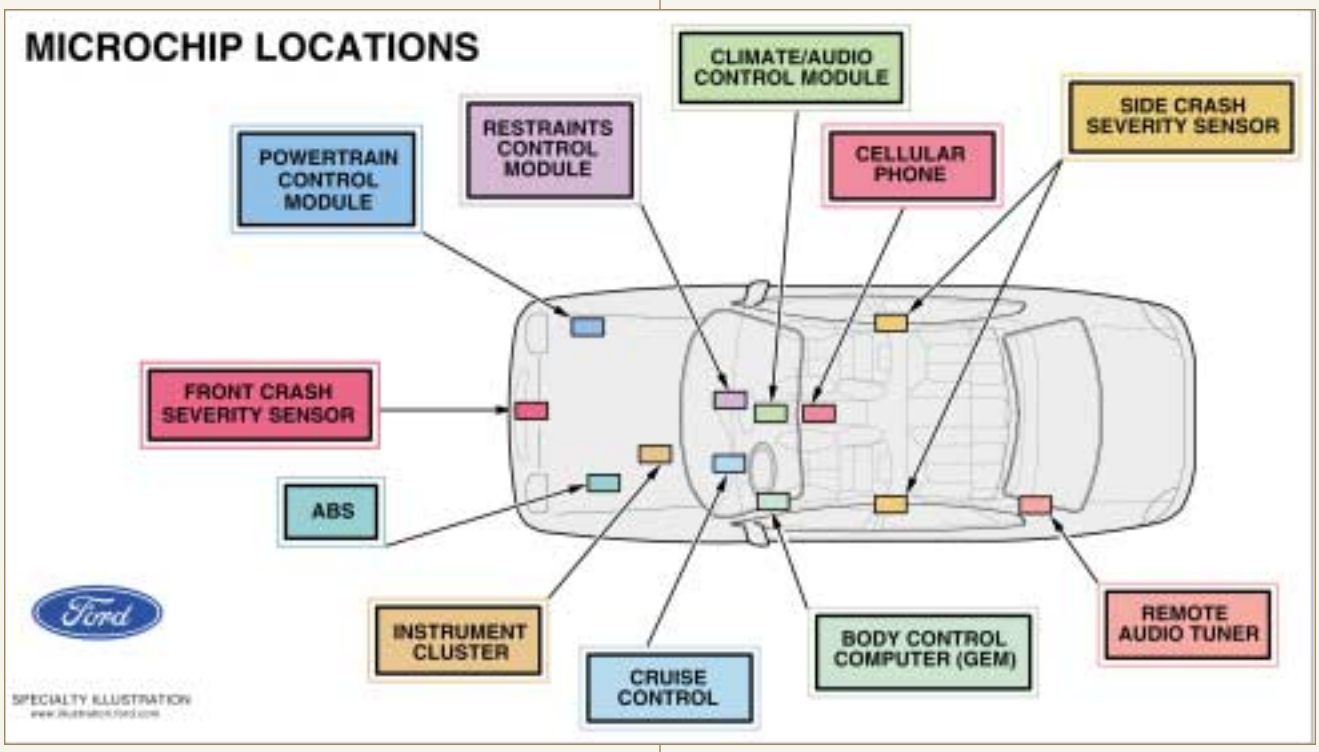
Weyerhaeuser's state-of-the-art Green Mountain sawmill uses scanners and computers to optimize the yield and value from each log. The new technology has increased yields by 30 percent over the past five years, helping hold down lumber costs.

Lighting

Shed some light on the subject…for less. Using increasingly sophisticated software plus computer-aided design and testing, researchers have been able to sharply reduce lighting costs. Do the math. Illuminating a porch 10 hours a night, 365 nights a year with a standard 100-watt, 750–1,000 hour incandescent bulb costs about $38 a year (using a rate of 10¢ per kilowatt-hour for electricity and bulb costs of 30¢ each). Today's technology-improved, screw-in 23-watt fluorescent bulb, however, gives off just as much light, lasts 10,000 hours and consumes only $8.40 in electricity per year. Spread the $18 bulb cost over the $2\,3/4$ years it will burn and the total bill comes to just $15 annually. That's 60 percent less than yesterday's technology could deliver. Newer technologies and advances in LED lighting provide even greater cost reductions—energy savings of up to 97 percent for bulbs that last 100,000 hours. The newest LED bulbs burn substantially brighter yet can significantly lower the bill for operating traffic lights, building exit signs and many other lamps that must burn continuously.

Plane Design

In making the 777, Boeing pioneered a new design process that uses a computer program called CATIA to digitize the entire aircraft. Eschewing the usual Mylar drawings, Boeing developed a program that allows engineers to "fly" through a computerized prototype of the aircraft, iterating the design in virtual space. The result is a big reduction in cost. Rework time on the plane's design was reduced 60 percent to 90 percent over previous models, repair time has been cut 80 percent and fuel efficiency is greater, not to mention that the 777's noise signature is significantly lower.



Modern autos use upward of 120 microchips, not just to ensure driver comfort and safety but to cut operating costs in numerous ways—improving gas mileage, reducing tune-ups, providing engine diagnostics, even cutting insurance costs by enabling companies to track operators' driving habits. With a package of chips costing no more than $140, today's Ford Taurus wields far more computing power than the multimillion-dollar mainframes and lunar excursion modules used in the 1968–72 Apollo space program. Vehicle functions whose costs were once prohibitive are now commonplace.

Direct savings show up in every corner of the economy, reducing pressure for companies to raise prices. Even better, the new technology is often powerful enough to allow many companies to lower prices, a trend most evident in the computer and electronics industries.[3] *(See Exhibit 7.)*

In 1985, when Ford Motor Co. wanted data on how cars withstood accidents, it spent $60,000 to slam a vehicle into a barrier. Today, Ford's supercomputers can simulate the same collision in 15 minutes for $200. By 2001, the cost of a frontal "crash" in cyberspace will be down to just $10.

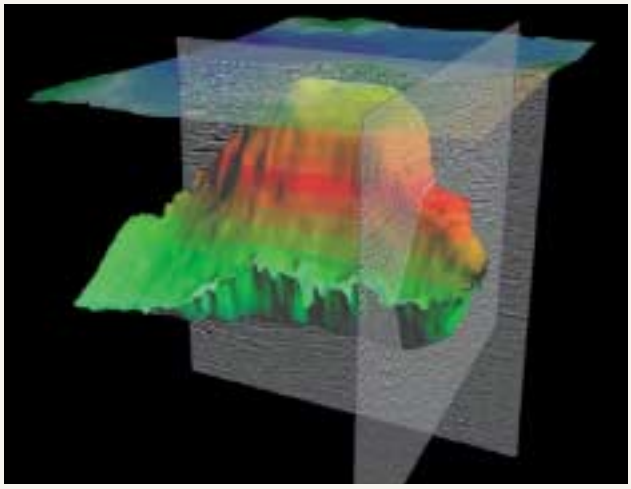
In the airline business, the Final Approach Spacing Tool, air traffic control software developed for NASA, makes take-offs and landings more efficient. The system has already cut two minutes off the average landing time at Dallas/Fort Worth International Airport. When fully operational nationwide, it will save airlines almost $1 billion a year in jet fuel.

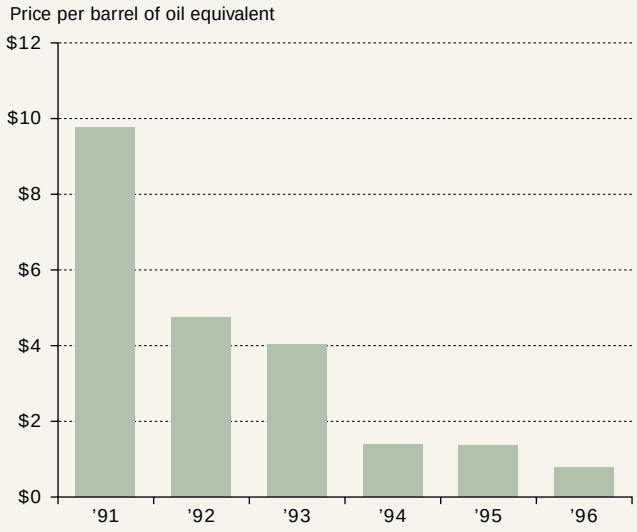
Microprocessors have replaced conventional hydraulic motion platforms in the Pan Am SimCom flight simulator for the Beechcraft King Air B-200. Separate electronic systems recreate the visual, motion and sound experiences critical to pilot training.

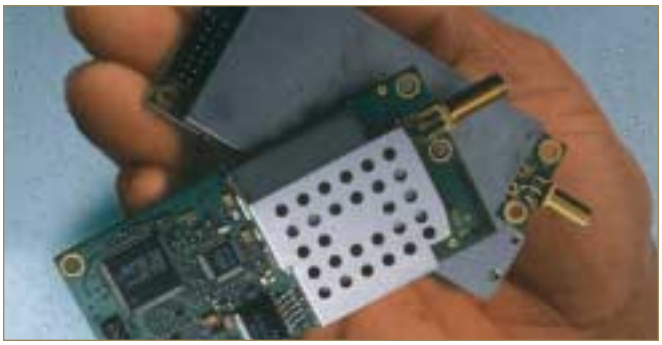
Exhibit 8

Barrels of Savings

Using 3-D seismic exploration technology, Amoco has cut the cost of finding oil from nearly $10 per barrel in 1991 to under $1 today. The 3-D seismic process reflects sonic waves off underground rock formations, hydrocarbons and other minerals to produce a three-dimensional image of the subsurface and better predict where oil resides. Computer programs and modeling techniques acquire data along multiple subsurface grids and correlate it with historical production numbers to forecast the likelihood of oil and natural gas reserves. Ten years ago, a detailed survey would average just 24,000 traces of seismic data, but today's supercomputers yield 28 million—an increase of more than a thousandfold. Other technologies have helped cut drilling costs. Baker Hughes' AutoTrak, for example, is a smart downhole guidance system that continuously keeps the drill bit within one meter of its preprogrammed course. Geosteering has cut rig operating costs as much as 55 percent.







Moving the nation's output of goods and services from producers to consumers is an expensive undertaking, costing billions of dollars annually. Wal-Mart alone racked up 600 million route miles in 1999, making 1.2 million deliveries to its nearly 3,000 stores. How does modern computer technology cut costs? Three years ago Wal-Mart purchased mobile communication sets for its 4,300 tractors from HighwayMaster Corp. of Richardson, Texas. The units include an on-board computer featuring a global positioning system, a voice-activated cell phone and a Cellemetry data transceiver, monitoring each truck's location, load weight, speed, gas consumption, odometer miles, idling time and more. Trucks roll empty less often, fewer dispatchers are needed, gas mileage is cut, trailer theft is down, idling time is reduced, records automatically accrue and driver turnover falls. Total cost savings are up to 20 percent in some cases. When applied to the 6 million to 8 million detachable trailers in the United States, the savings could be huge.

Wal-Mart, the nation's largest retailer, cut up to 20 percent off the cost of operating a delivery truck by installing computers, global positioning gear and cell phones in 4,300 vehicles. Supercomputers produce a thousandfold improvement in seismic data, allowing BP Amoco to find oil for under $1 a barrel, down from nearly $10 a barrel in 1991. *(See Exhibit 8.)* Processing an Internet transaction costs a bank just a penny, compared with $1.14 with a pen, paper and teller. *(See Exhibit 9.)*

Cutting direct costs means consumers pay lower prices. At home, too, microprocessors are saving Americans money. Computer chips are now tucked inside just about every home appliance—from coffeemakers to garage door openers. Since 1972, for example, chips have helped reduce energy consumption by 36 percent for room air conditioners, 42 percent for clothes washers, 50 percent for dishwashers, 61 percent for freezers and 67 percent for refrigerators. *(See Exhibit 10.)*

Exhibit 9

First in Line and Last in Cost

With the help of the Internet and PC software, today's banks can serve customers for a tiny fraction of the cost of yesterday's method—providing a teller at a branch. Banking transaction costs on the Internet average a scant 1¢ each, compared with $1.14 for face-to-face, pen and paper communication. Moreover, via the Internet or a dial-up connection, you're always first in line. None of this, of course, would be possible without the information processing power of the chip.

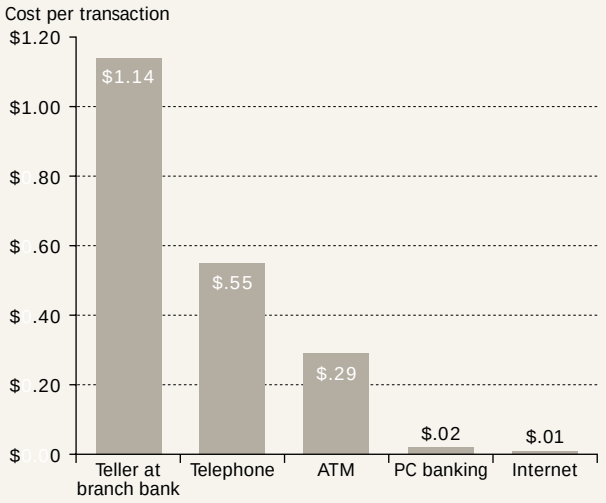
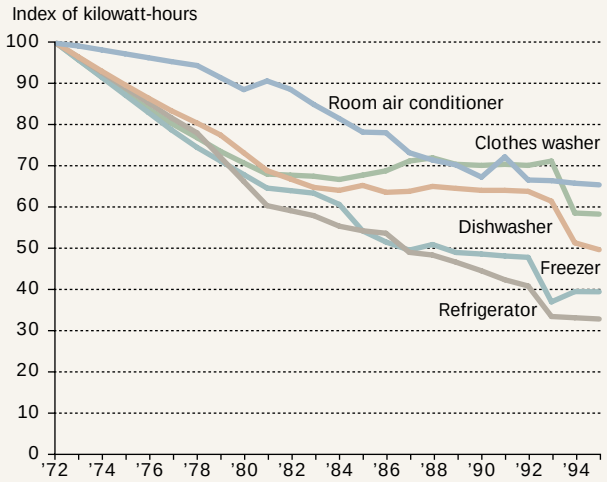


Exhibit 10

Is Your Refrigerator Running?

Yes, and a lot more efficiently than it did a quarter century ago. Smart power systems—replete with integrated hardware/software, multichip modules, smart sensors and other features—have reduced the cost of operating home appliances by one-third to two-thirds over the past 25 years. The biggest cut in appliance operating costs is for refrigerators, which require only a third the electricity they did in 1972, the energy equivalent of a 75-watt bulb.

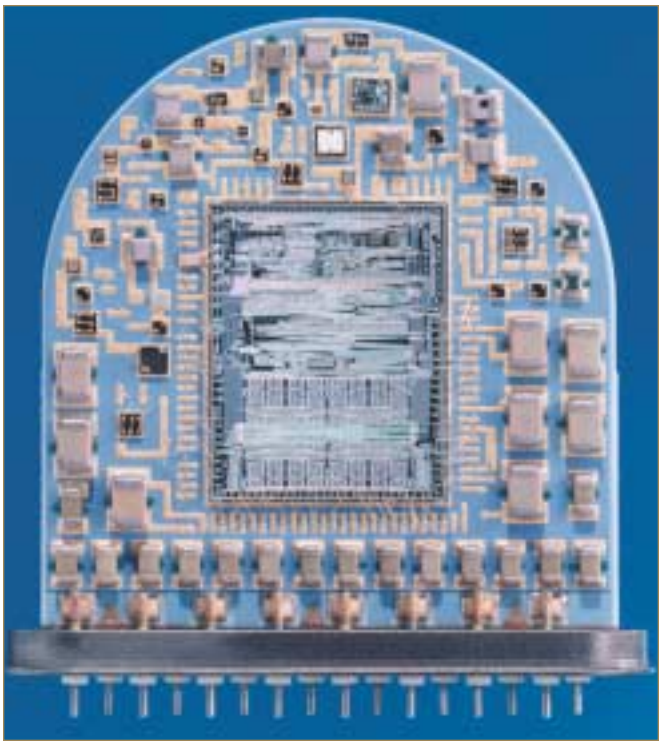


Electronic commerce. The past quarter century's inventions and innovations are changing the way Americans buy and sell. Computers, high-speed modems, fiber-optic cables and encryption software came together with the Internet and electronic mail in the 1990s to create e-commerce. Americans are going online to schedule flights, download music, buy books, invest in stocks, purchase cars, find jobs and order groceries for home delivery.

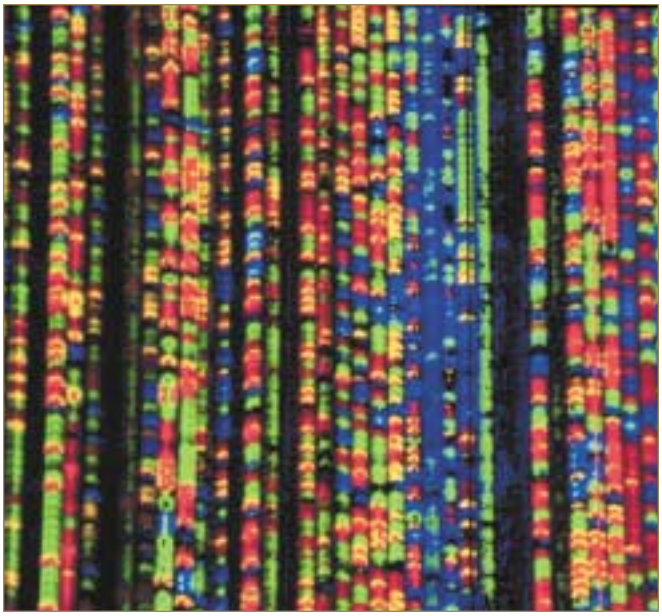
The cyberspace marketplace is still in its infancy, amounting to only $151 billion in 1999. By 2003, however, it will rise to an estimated $1.7 trillion, then continue to soar. Consumer purchases get most of the attention, but four-fifths of e-commerce involves business-to-business transactions.

Electronic commerce alters the economy's cost structure by intensifying competition. The idea of rivalry among sellers driving down prices has a long pedigree in economics, dating back at least as far as Adam Smith. And there's precedent for technology promoting competition.

The DSP chip, used in appliance motors, not only boosts the operating efficiency of refrigerators and the energy-saving capabilities of washing machines, it also makes for quieter air conditioning systems.



Forty-two percent of severely to profoundly hearing-impaired Americans ages 18 to 44 are not in the labor force, compared with just 18 percent of the general population. The hybrid microchip in Advanced Bionics' cochlear implant can help deaf adults understand more than 90 percent of words without lip-reading. Otic implants, bionic limbs, insulin pumps, pacemakers and other smart medical devices contribute not only to quality of life but also to our labor force and productivity at work.



Although still in its infancy, computational biology promises to be one of the grandest spillovers from the microprocessor. Ever-faster computers have accelerated the process of gene sequencing, helping us with everything from making safer burgers to decoding human DNA.

The canals and railroads of the 18th century and the air transport and interstate highways of the 20th century expanded customer bases and decreased the cost of bringing goods and services to market.

The ease of shopping nationally—or even globally—online frees consumers from dependence on local merchants. We can buy wherever products are cheapest, then get delivery overnight. Low-cost outlets win additional business and thrive. High-cost sellers shrink and eventually go out of business. At the same time, electronic commerce reduces or even eliminates layers of retail and wholesale, cutting the cost of marketing and distribution.

Today, e-commerce is a worldwide virtual marketplace, open for business 24 hours, seven days a week. *(See Exhibit 11.)* Internet sites proliferated in the past decade as consumers discovered the convenience of shopping online. At a click of the mouse, they can visit the sites of established retailers—jcpenney.com, walmart.com and homedepot.com. And they have access to hundreds of newcomers, including bookseller amazon.com, lens merchant cheapcontacts.com and sporting goods dealer fogdog.com.

Cyberspace business is a free-for-all, with entrepreneurs striving to meet consumers' needs by devising seemingly endless schemes. Dell Computer lets buyers customize computers online. Internet companies conduct traditional auctions, such as the ones at ebay.com, and so-called reverse auctions, where sellers bid for buyers. Priceline.com and others play a version of "Let's Make a Deal," with customers naming a price for airline tickets, hotel rooms and other items. Sellers then decide whether to accept. Mercata.com brings bulk discounts to the Internet by assembling groups of buyers who want the same products. Ubarter.com matches companies' surplus goods and services in noncash transactions. New applications are making shopping online even easier. Programs scour cyberspace for the best prices—sometimes doing the comparison shopping while the buyer sleeps.

Declining long-run average costs. The economics of the Industrial Age centered on the cost structure of yesterday's major industries—manufacturing, mining, agriculture and construction. Their costs may fall as output increases, but not for long. Well before demand is satisfied, enterprises exhaust economies of scale and start bidding

Exhibit 11

Better Shop Around

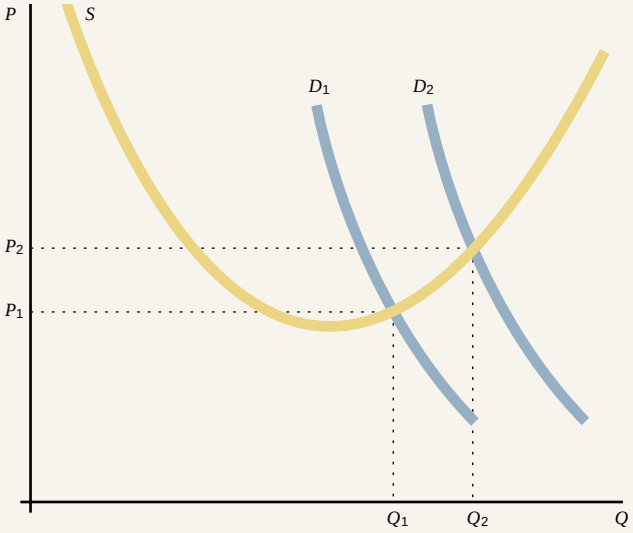
The emergence of the Internet and electronic commerce has redefined how today's buyer can better shop around. In at least 10 ways, outlined below, e-commerce has heightened competitiveness in the markets that make up GDP and thereby flattened the economy's aggregate supply curve. The upshot: today's shifts in aggregate demand don't have the inflationary consequences they once did.

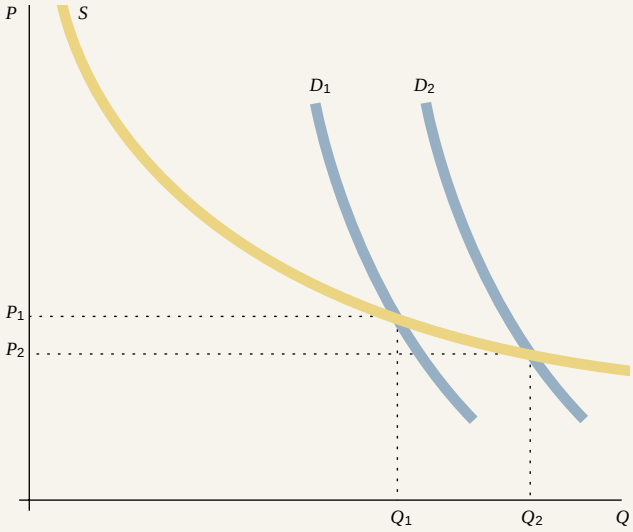
officemax.com **victoriassecret.com** **peapod.com**	**E-tail.** Avoid the company's bricks-and-mortar store and go online to shop at its web site. Office products, lingerie, groceries and more are all available for home delivery at the click of a button.
dell.com **ssmills.com** **amishreflections.com**	**Direct commerce.** Be direct. Cut out the middleman and buy directly from the producer. Computers, carpeting, furniture and a growing number of other products are accessible factory-direct.
amazon.com **cheapcontacts.com** **wine.com**	**Centralized marketplaces.** Shop in a global marketplace that transcends conventional boundaries. Buy the book, contact lenses, wine and other items your local store doesn't stock.
ebay.com **bid.com** **sothebys.com**	**Auctions.** Bid on whatever you're looking for in a giant online trading community. Shop by product category (for example, antiques) or by product model number (Bose 501 speakers).
reverseauction.com **buyersedge.com** **nextag.com**	**Reverse auctions.** Watch multiple sellers bid prices down to win your business. Make instant purchases at any time in a market where prices are continuously falling.
mercata.com **accompany.com** **letsbuyit.com**	**Group buying systems.** Use group buying power to get quantity discounts. The more people who purchase an item, the lower the price for all. Supply curves don't just flatten, they slope downward.
priceline.com **expedia.com** **demandline.com**	**Buyer-driven systems.** Set the maximum price you're willing to pay for a product and let sellers compete for your business. Autos, air travel, hotel rooms and more may be cheaper than you think.
rusure.com **clickthebutton.com** **dealtime.com**	**Shop bots.** Take an intelligent agent shopping with you to look over your shoulder and keep you from paying too much. Shop bots scan other sites and comparison shop so you don't have to.
mysimon.com **pricepulse.com** **respond.com**	**Personal shoppers.** Use a personal cybershopper to shop for you at thousands of online stores. Get what you want at a great price by letting technology work for you efficiently and anonymously.
freemarkets.com **verticalnet.com** **ubarter.com**	**Business-to-business commerce.** Cut the cost of doing business by shopping for your company's equipment, parts, supplies and services in a competitive global market.

Exhibit 12

Mind Your Ps and Qs

The concepts of price level *(P)* and aggregate quantity *(Q)* are highly dubious. Nonetheless, statisticians persist in creating these two measures, which are scrutinized out to their third digit. Perhaps the biggest loss of usefulness from aggregating output is caused by combining industries whose returns to scale are increasing with those whose returns are decreasing. The effect of an increase in demand on prices depends on whether raising output drives average costs up or down. Average costs usually rise in industries with mostly variable production costs. The industries that dominated yesterday's material world (such as agriculture, mining, construction and heavy manufacturing) and much of the less-skilled services economy (household, personal, repair and cleaning services, for example) are in this category. But for many other, often newer, sectors of the economy (such as computer hardware and software, communications and pharmaceuticals), average costs often decline as output expands because high fixed costs are spread over a large number of buyers. To the extent that economic expansion comes in industries of the latter type, GDP can grow without the inflationary consequences often feared.





up prices for scarce inputs. Production costs for additional units rise, slowly at first but then more rapidly.

The bottom line: as Industrial Age companies expanded operations, they had little choice but to raise prices to cover higher costs. In an economy dominated by rising-cost industries, additional demand can ignite inflation. It's this view of basic costs, accurate for an industrial economy, that led analysts to conclude that rapid growth can threaten price stability.

The Information Age gave birth to companies and industries with a decidedly different cost structure. Their output exhibits increasing returns to scale over a wide range of products. Instead of rising with additional output, average costs continue to slope downward. *(See Exhibit 12.)* Goods and services become cheaper to produce as the size of the market increases. This gives companies a powerful incentive for aggressive pricing, including quantity discounts.

Information Age enterprises need more customers to recoup their investment in new-product development. Today, bigger is often better, which helps explain the surge in mergers and acquisitions in the 1990s. Companies combine to capture the advantages that come from downward sloping long-run average cost curves. *(See Exhibit 13.)*

What frees today's technology from the old model of increasing costs? It's partly changes in the nature of what we produce. Yesterday's goods and services had a "rivalry" in consumption, in which one person's purchase barred anyone else's. In the New Economy, more companies make products—such as information and entertainment—that don't disappear or even degrade with use. They can satisfy many consumers at the same time, so additional demand doesn't lead to shortages.

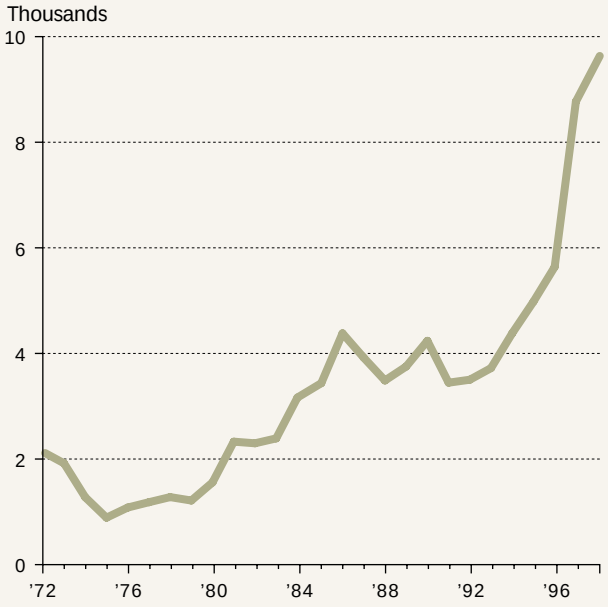
Moreover, many New Economy businesses connect people. It's expensive to link one or two users in a network, but it's far less costly to add customers once the delivery

Exhibit 13

Bigger Is Better

Never has the number of corporate mergers and acquisitions been higher. Advances in information management and communication have helped firms cut costs by consolidating output into larger operations. Technology has made higher output the key to lower prices across many industries.

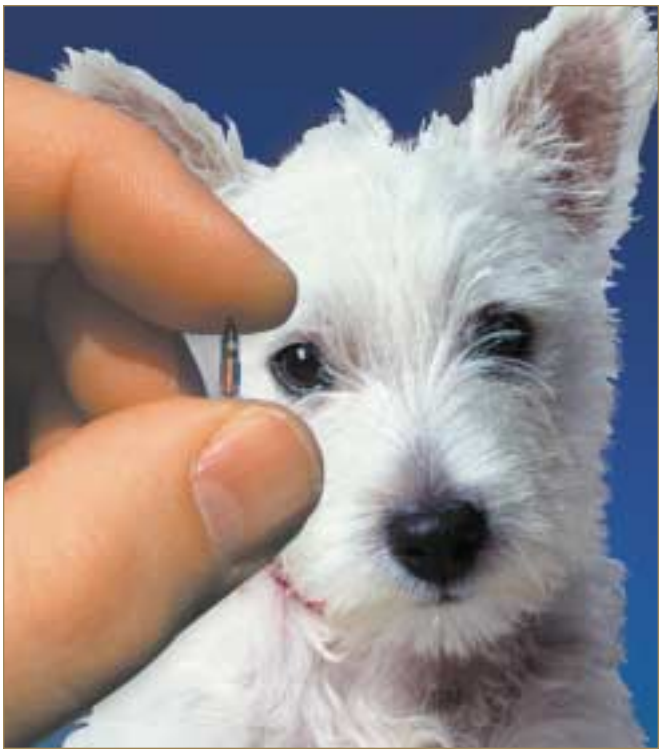
U.S. Mergers and Acquisitions



system is big enough to serve a critical mass. This has always been true for telephones, trucking routes, airlines, television and electricity. Now it also applies to the Internet, media and telecommunications, all industries on the economy's leading edge.

Finally, the Information Age is largely a world of high fixed and low marginal cost. Modern technology often requires staggering startup costs, with tens or even hundreds of millions of dollars going to design products, recruit workers, purchase equipment and establish a presence in the marketplace. Once in production, however, delivering additional goods or services is typically rather cheap.

Consider prescription drugs. It requires an average $350 million to bring a new pill to market. At that price, the cost of producing the first dose is exorbitant. If it takes a penny to produce each additional one, though, average production costs fall quickly—to $350 each at 1 million pills, $3.51 at 100 million and 4¢ at 10 billion. *(See Exhibit 14.)*



For about $60, pet owners can have a biocompatible glass capsule about the size of an uncooked grain of rice implanted between their pet's shoulder blades. A tiny memory chip inside the capsule acts as a miniature transponder that relays information via low-frequency radio signals. With the help of a special scanner (about $400), veterinarians, animal shelters and the like can tap into a nationwide database of pet owners, their addresses and phone numbers, plus the animals' characteristics, pedigree, medical history and more. Not only does the system make locating a lost pet much easier, it has made pet insurance affordable since conclusively identifying Fido is now possible.

Keeping track of livestock can mean big savings for ranchers. With the help of electronic "hoof meters," today's high-tech dairy farmer can check on the whereabouts of any one of his cows by double-clicking on the animal's face on a computer monitor. The history of each cow's food and medicine intake, weight, milk yield and even temperature is instantly available from a comfortable remote location. What once took a legion of workers now takes just one.

Exhibit 14

Declining Long-Run Average Cost: The Supply-Side Revolution

It takes roughly $350 million to bring the average new drug to market. That's just for the first pill. Making the second costs closer to a penny. Clearly, nobody's going to pay $350 million for that first pill. So to make medicine affordable, drug companies have to spread the cost of developing their products over years and years of sales. The larger the sales, the less each unit can cost the consumer. Assuming $350 million in development costs and 1¢ marginal production cost thereafter, the average cost of making a pill would fall from $350 million for producing just one to $350.01 each for making a million to 4¢ each for sales of 10 billion. Prices fall in inverse proportion to the size of the market. This example illustrates that for pharmaceuticals demand is not the enemy of price but its friend. The higher the demand, the lower the price because, after all, you can't have quantity discounts without quantity.

Many products in today's economy are produced under exactly this type of condition—high fixed and low marginal cost—and thus enjoy long-run average cost curves that slope downward. Software, CDs, tapes, movies and even many sophisticated electronic products are in this category. Economies of scale also tend to dominate industries that deliver their goods or services through a network—such as telephone, television, radio, facsimile, e-mail, Internet and other communication or news services; passenger and freight air travel, railroad traffic, trucking, package delivery, pipelines and other transportation services; and electricity, gas, water, sewer, garbage and other public utilities.

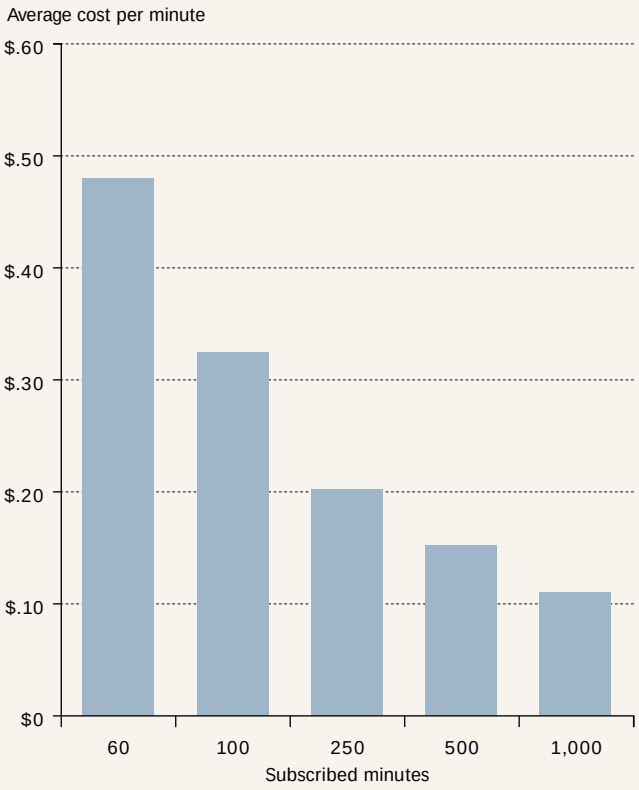
Even parts of the wholesale and retail distribution network can enjoy substantial economies of scale. The same can apply to services that are highly knowledge-intensive, such as education, legal and medical services, because knowledge is nonrivalrous. The cost of developing the infrastructure to train just one doctor is huge, but once it's set up, training the second costs much less.

For all these industries and others, the larger the market, the less each unit can cost.

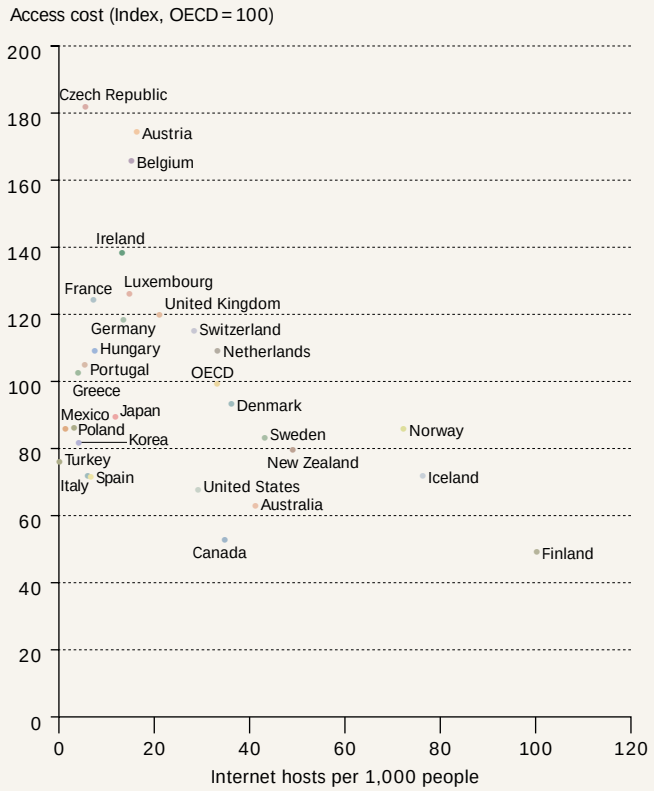
Average Cost of a Pill

Cost
1 . . . . . $350,000,000.00
10 . . . . . 35,000,000.01
100 . . . . . 3,500,000.01
1,000 . . . . . 350,000.01
10,000 . . . . . 35,000.01
100,000 . . . . . 3,500.01
1,000,000 . . . . . 350.01
10,000,000 . . . . . 35.01
100,000,000 . . . . . 3.51
1,000,000,000 36
10,000,000,000 04
Quantity

a. Wireless Rates in Dallas, March 1999



b. Internet Access Cost and Host Density, 1998



Many of the new technologies have the same cost structure. Software companies spend millions on programmers who write line after line of computer code. Additional copies are virtually costless if downloaded via the Internet. In Dallas, the average cost of a minute of cell phone service falls from nearly 50¢ at 60 minutes per month to just a dime for 1,000 minutes. *(See Exhibit 14a.)* Once they invest in equipment, Internet service providers can add new subscribers for very little. The Scandinavian countries, the United States, Canada and Australia show the deepest penetration of Internet households per 1,000 residents, and they also have the lowest access fees. *(See Exhibit 14b.)*

The $9 trillion U.S. economy is sprawling and diverse, with millions of companies. Some operate with increasing costs, others with decreasing costs. Fast growth in the New Economy creates more of the latter with each passing year. This alters the cost structure for the nation as a whole, even though a large number of traditional industries continue to exist.

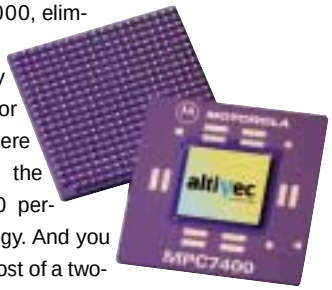
Spillovers add to the economy-wide savings. Computers, software, high-speed data transmission and other new technologies lower the cost of doing business across wide swaths of the economy. *(See Exhibit 15 on page 22.)* Even such old-line industries as steel, textiles and automobiles are taking advantage of Information Age cost cutting. As a result, the overall economy's cost structure can slope downward, even though many companies face decreasing returns to scale.

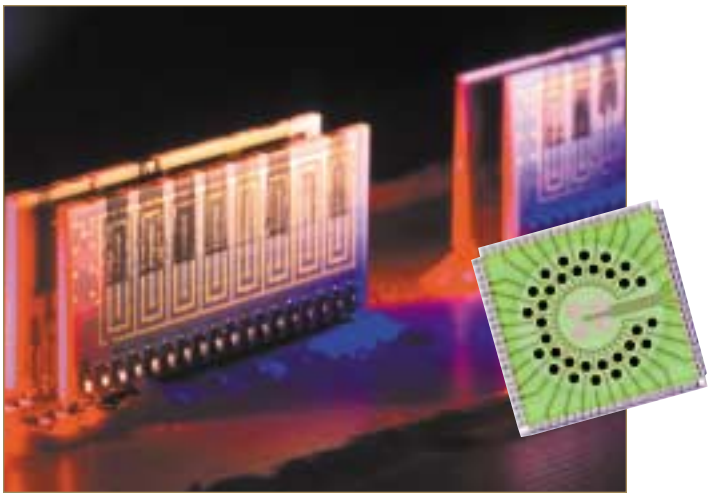
Give Growth a Chance

The New Economy isn't a mirage. The microprocessor set off a revolution that spawned a new vitality and challenged old notions about the economy's limits. And there's no end in sight. Industries and applications already in the marketplace will take decades—in some cases, a century or more—to fully mature. More spillovers from the microprocessor, and the innovations those technologies will beget, are just over the horizon.

We think of the years straddling 1900 as wonderfully inventive times, personified by Edison, who in bringing electricity to the market launched a revolution. If anything, our times teem with unmatched potential for technological change. Edison gave the world a substitute for physical power. Today's entrepreneurs bring to the fore a more

Want to make a movie? Shooting a one-hour flick on standard celluloid film requires three dozen 400-foot reels of 16-mm film at $150 each. Add processing and editing fees and the bill grows to nearly $120,000, even before the cast and crew are paid. Or buy Canon's XL1 digital video camera for about $4,000, eliminate the processing fees and edit it yourself on an Apple Cinema Display powered by a PowerMac G4 ($6,500 for the two), using Adobe Systems' Premiere software package (about $600). Cost the microcinema way: about $11,000—90 percent less than with yesterday's technology. And you can make your next movie for the $10 cost of a two-hour DV cassette.





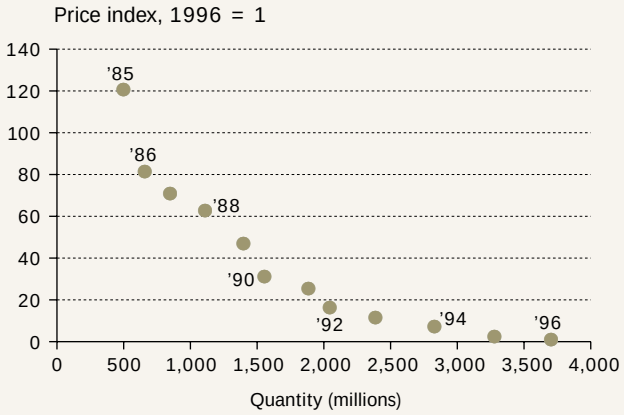
Cyrano Sciences has developed a handheld device with sensors that detect food spoilage, volatile compounds, auto emissions, leaking pipes, land mines and strep bacteria. Also in the works is an inexpensive "nose chip" that could be embedded in home appliances.

Exhibit 15

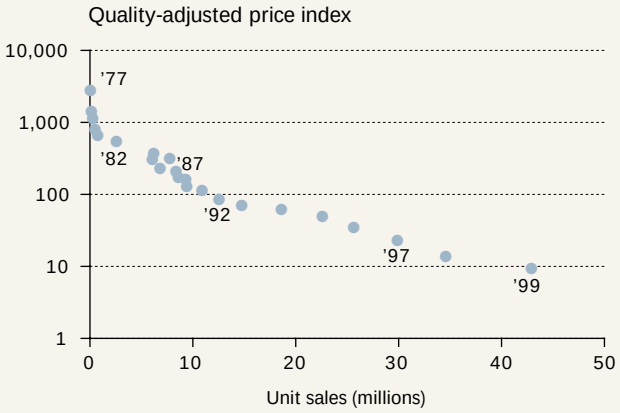
A Parade of Ps and Qs

Associating higher quantity with lower prices certainly isn't the norm in current economic thought. Yet it can and does happen in many industries. Cell phone and long-distance service, air travel, electricity, computer manufacturing and TV set production are but a few examples.

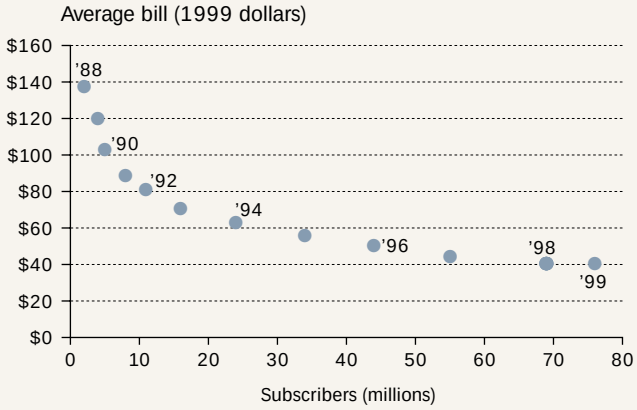
Price vs. Quantity of Microprocessors, 1985 – 96



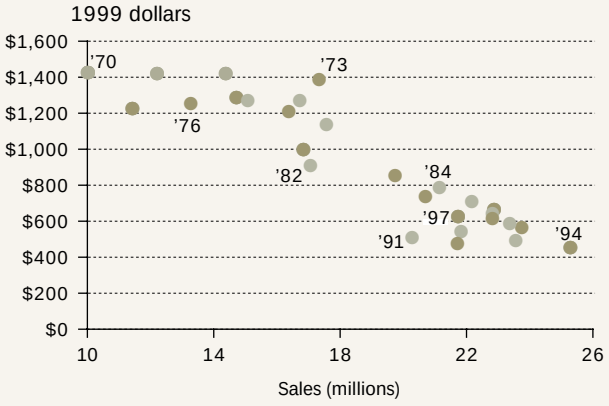
PC Sales and Prices, 1977 – 99



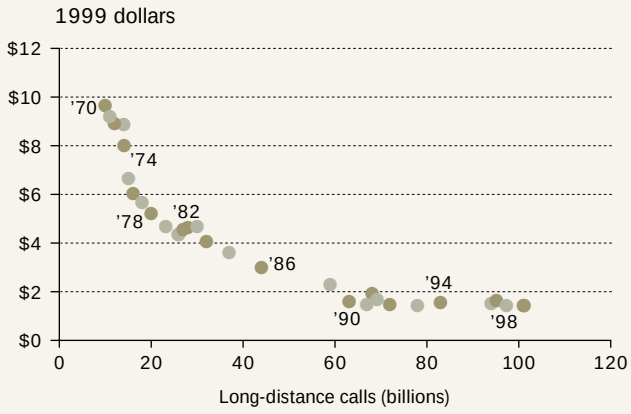
Cost vs. Quantity of Wireless Calls, 1988 – 99



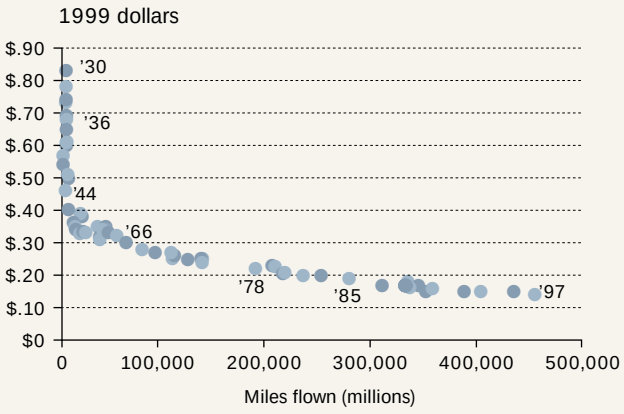
Cost vs. Quantity of Television Sets, 1970 – 97



Cost vs. Quantity of a Long-Distance Call, 1970 – 98



Annual Miles Flown and Cost per Mile, 1930 – 97



versatile, far-reaching asset—brainpower. Our inventory of science and technology—the raw material of new products and processes—exceeds anything seen before.

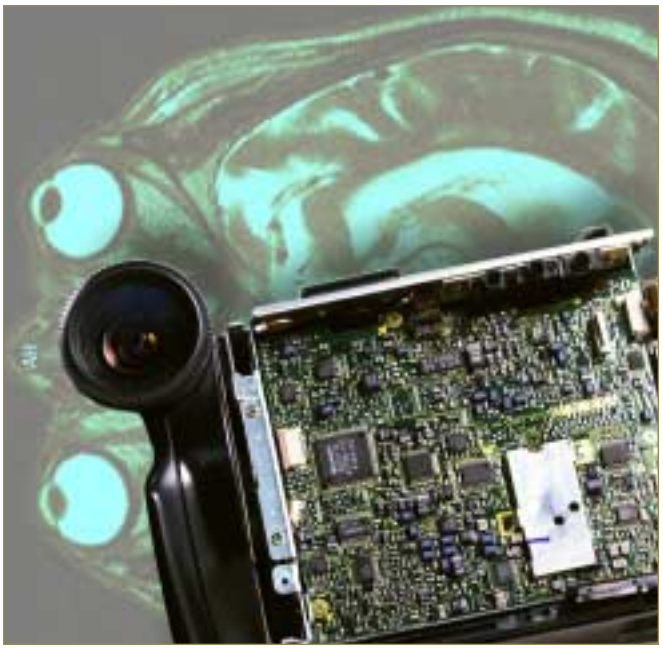
Global positioning satellites, artificial intelligence and virtual reality are only now emerging as sources of new goods and services. Biotechnology, too, is still in its infancy. Armed with the tools of computational biology, scientists will soon complete the Human Genome Project, an effort to identify our entire genetic code. The research could make possible treatments for a host of conditions—from baldness to Alzheimer's disease. Nanotechnology, the emerging science of molding matter at the molecular level, promises materials that conduct electric pulses with only minute resistance and machines the size of microbes to attack viral diseases.

Science gives us new technologies, but entrepreneurs forge new products and organize new industries. From Thomas Edison to Bill Gates, the great architects of enterprise stand as symbols of the legions who turn technology into profits. Capitalism's competition is a race, with the prize going to those who harness technology to deliver newer, better and cheaper products. The new paradigm rises out of a powerful mix—a dynamic market economy percolating with technology.

The New Economy manifests America's future, but making the most of it requires new thinking. We can no longer operate under the old assumptions about how fast the economy can grow, how low unemployment can go and when policymakers should apply the brakes to ward off inflation. Judging from the 1990s, the upper limit for noninflationary growth may be a full point or more higher than most economists thought at the start of the decade.

Faster growth and low inflation do go together, not just in the short run but in the long term as well. In fact, we've arrived at lower inflation not despite faster growth but because of it. The New Economy needs to expand to capture the benefits of declining long-run average costs. We shouldn't underestimate the microprocessor technology's ability to make us more productive. If industries and workers continue to leap in efficiency, pressure to raise prices won't be as great.

By itself, growth is no longer an automatic trigger for inflation. We cannot assume that strong GDP or vigorous



By allowing us to replicate the power of the human brain and put it wherever we want, the microchip launched a new economic paradigm that is transforming virtually every aspect of the world around us. Applications for the chip's "canned brainpower" are limited only by our imagination.

demand makes a spike in prices inevitable. As we advance into the New Economy, the best course is to keep the emphasis on direct measures of the price level. After all, the best place to look for inflation is in price statistics, not in readings of economic activity levels.

High inflation is undeniably a curse. Rapidly rising prices rob consumers of their hard work and savings. Uncertainty about future costs is unsettling for both individuals and companies. Most important, too-high inflation always leads to a day of reckoning, when the economy must be throttled back to restore stable prices. The worse the inflation, the tighter the screws must be turned.

It's right to be vigilant about inflation. Even so, we cannot ignore the changes sweeping the nation and world. The new economic paradigm has brought us the best of all worlds—innovative products, new jobs, high profits, soaring stocks. And low inflation.

It's wise to be wary of inflation—but also to give growth a chance.

—W. Michael Cox and Richard Alm

Notes

[1] The economy hasn't always been so stable. From 1853 to 1953, the country endured recession 40 percent of the time. Since 1982, the economy has been in a slump just under 4 percent of the time.

[2] At 106 months, the 1960s expansion was then the longest in U.S. history. The current expansion, which began in March 1991, eclipsed that record in February 2000.

[3] For a thorough examination of pricing, see "Time Well Spent: The Declining *Real* Cost of Living in America," the Dallas Fed's 1997 annual report essay.

Acknowledgments

"The New Paradigm" was written by W. Michael Cox and Richard Alm. The essay is based on research conducted by Cox, senior vice president and chief economist, Federal Reserve Bank of Dallas. Sonja Kelly, Meredith Walker, Tom Siems and Charlene Howell provided research assistance.

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Worldwide Internet hosts: "Hobbes' Internet Timeline," info.isoc.org. A host is a domain name that has an IP address record associated with it.

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Page 10, **America's Shifting Source of Growth** *County Business Patterns*, various years. Employment growth measured as the growth over the previous decade in high-tech industry employment as a share of total employment growth. Information technology producing industries in 1970: SIC codes 283, 3573, 3579, 3650, 3660, 3671–3674, 3679, 3810, 3821, 384, 4100, 4200, 4500, 4600, 4700, 481, 483, 489, 4900, 62, 8000, 8100 and 8200. In 1980: SIC codes 283, 3573, 3579, 3650, 3660, 3671–3674, 3679, 3810, 383, 384, 4100, 4200, 4500, 4600, 4700, 481, 483, 489, 4900, 5022, 512, 62, 8000, 8100 and 8200. In 1990 and 1997: SIC codes 2830, 3571, 3572, 3575, 3577–3579, 3650, 3660, 3671, 3672, 3674–3679, 3695, 3823, 3825–3827, 3840, 4100, 4200, 4500, 4600, 4700, 4810, 4830, 4840, 4890, 4900, 5045, 5120, 5734, 6200, 7371–7379, 8000, 8100 and 8200.

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Page 14, **Barrels of Savings:** "The Role of 3D Seismic in a World Class Turnaround," paper presented by William K. Aylor, Jr. at Society of Exploration Geophysicists convention, November 1997.

Page 15, **First in Line and Last in Cost:** *The Digital Economy Fact Book*. Data are for 1996 and are in 1999 dollars.

Page 15, **Is Your Refrigerator Running?:** Association of Home Appliance Manufacturers, www.aham.org.

Clothes washer and dishwasher: Energy use is in kilowatt-hours per cycle.

Refrigerator: Energy use is for an automatic defrost, top mount freezer and is in kilowatt-hours per year.

Freezer: Energy use is for an upright, automatic defrost and is in kilowatt-hours per year.

Room air conditioner: Energy use is based on 750 hours of operation and is in kilowatt-hours per year.

Page 19, **Bigger Is Better:** *Statistical Abstract of the United States*, various years. Covers transactions of $5 million or more including mergers, acquisitions, acquisitions of a partial interest that involves 40 percent stake in the target or an investment of at least $100 million, divestitures, and leveraged transactions that resulted in an ownership change.

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Page 22, **A Parade of Ps and Qs**

Price vs. quantity of microprocessors: "Price Indexes for Selected Semiconductors, 1974–96"; Texas Instruments. Quantity includes microprocessors, microcontrollers and digital signal processors.

PC sales and prices: Bureau of Labor Statistics; *The Wall Street Journal Almanac 1998*. 1999 sales are estimated. Chart scale is logarithmic.

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Cost vs. quantity of TV sets: 1978–88, Sears, Roebuck and Co. catalogs. 1992–97, J.C. Penney Company Inc. catalogs. Remaining years are estimates based on linear extrapolation from the two real values surrounding these estimates.

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The YEAR in Review

The Federal Reserve Bank of Dallas marked the final year of the century with the same spirit and commitment that defined the Bank when its doors opened in 1914. Initiatives and services in 1999 reflected the Bank's continued dedication to efficient and reliable financial services, sound banking and robust economic growth in the Eleventh District.

Economic Overview

In 1999 the Eleventh District continued the economic dynamism that prevailed throughout the decade. The District's reduced sensitivity to oil prices and the increased diversification of its export markets diminished the impact of low oil prices in early 1999 and the lingering effects of the 1997–98 Asian financial crisis.

One engine of the Texas economy has been the technology sector, which grew at almost twice the rate of total nonfarm job growth in the 1990s. High tech was still reeling from the Asian crisis in the first half of 1999 but bounced back in the second half. With the Y2K rollover out of the way, firms are poised to increase spending on technology.

The service sector was another source of strength for the Texas economy last year. This was especially true of distribution services such as trucking and warehousing, air transportation, and business and financial services, all of which showed strong gains from trade with our NAFTA partners.

As the world economy picked up steam, Texas exports rose sharply during 1999.

In November Texas posted its lowest unemployment rate (4.1 percent) in nearly 20 years. Many of the state's large metropolitan areas have very low unemployment and very high labor force participation rates. To maintain employment growth in excess of working-age population growth, Texas needs continued in-migration.

The ingredients for strong growth in 2000 are all in place: higher oil prices, a strong world economy, and increasingly significant high-tech and distribution sectors ready to capitalize on the growth in trade and technology.

Financial Services

In 1999 the Dallas Fed continued to offer financial institutions enhanced services and technology to support a stable and efficient payments system. Through seminars and advisory groups, the Dallas Fed gained insights from customers into the value of Federal Reserve payments services and their use of Bank products and services.

Through its role as the support Bank for the Reserve Banks using IBM check processing equipment, the Dallas Fed contributed to planning for a new processing infrastructure that will enhance and standardize Reserve Bank check services. All Reserve Banks will move to the new processing platform over the next few years.

The Dallas Fed experienced a record year in currency operations, processing nearly 2.1 billion Federal Reserve notes. Currency inventory was increased in anticipation of the Y2K needs of District financial institutions. The Dallas Office provided warehousing services for the new notes and for notes from other Reserve Banks. The Dallas Fed also helped prepare for Y2K by processing excess currency for other Reserve Banks.

A Dallas Fed official led the Federal Reserve's effort to identify strategic locations, accessible to financial institutions across the country, for storing currency during the century rollover. This major leadership effort required coordination among all Federal Reserve Banks, all locations and the armored carrier industry.

The healthy regional economy and strong business climate were reflected in the volume of payment services items processed in 1999. The volume of processed checks rose by 4.4 percent, and more payment transactions moved to electronic delivery. The number of items presented electronically rose to 22.4 percent of all items processed, and the volume of commercial automated clearinghouse (ACH) transactions increased by 14.3 percent.

The Dallas Fed began providing three new services for the U.S. Treasury last year. The department's Bureau of the Public Debt consolidated 36 sites handling Treasury securities into three Fed offices—Dallas, Boston and Minneapolis—to improve customer service and reduce costs. The Dallas Fed also was selected as the nation's central processor for Treasury coupons. Additionally, the Treasury Department chose the Dallas Fed to manage the national Electronic Transfer Account (ETA℠) program, which will target millions of federal benefit recipients currently receiving payment by check.

The century rollover presented the Dallas Fed and the financial industry with a unique challenge last year. Extensive preparations and close working relationships with customers ensured a high level of readiness that paid off in a quiet, orderly transition from l999 to the year 2000.

Banking Supervision; Discount and Credit

The Eleventh District's banking industry posted another year of solid performance, with continued strong loan growth, stable net interest margins, healthy earnings and high capital levels. The year culminated with the passage of the most significant piece of banking legislation since 1933. The Gramm–Leach–Bliley Act, signed into law November 12, repealed Depression-era laws that barred banks from insurance and securities activities.

Banking Supervision staff worked with federal agencies to conduct Y2K compliance checks for all state-member banks, bank holding companies, and key service providers and vendors in the District. Discount and Credit staff worked with banks to file borrowing documents and identify collateral for possible loans from the Dallas Fed. As 1999 rolled over into the year 2000, all District financial institutions were armed with plans for business resumption and management of liquidity during the century date change period.

The Dallas Fed held workshops for boards of state member banks and others on their roles and responsibilities as well as the expectations of examiners. The Bank also hosted an interagency conference of senior federal banking regulators and a national forum for veteran consumer affairs examiners. The Dallas Fed was selected as the site for a national help desk for Federal Reserve System and state banking examiners using automated community bank examination products.

Research and Public Affairs

The Dallas Fed focused major research on public policy issues of interest to the business community and opinion leaders. Conferences, publications, briefings and presentations provided information and analysis on dollarization, the euro, the changing U.S. fiscal outlook, the monetary policy implications of oil prices, unilateral trade liberalization, minimum wage legislation and high-tech industries.

The Bank addressed international issues by sponsoring, together with the World Bank, a major conference on banking privatization. The Dallas Fed joined the World Bank, the Central Bank of Argentina and two major universities to cosponsor a conference on economic and financial issues Latin America faces.

An El Paso Branch conference on NAFTA drew economists, trade experts and other participants from the United States, Canada and Mexico. At the San Antonio Branch, civic leaders from around the country attended a conference on the economics of urban planning. The Bank also cohosted five forums with the National Center for Policy Analysis.

In 1999 the Bank launched its new, award-winning Internet site (www.dallasfed.org). The site features information on Dallas Fed operations, the Center for Latin American Economics, money and banking, technology, free enterprise, and regional, national and global economies.

The Dallas Fed continued to support economic education by conducting conferences and workshops for university faculty, high school teachers and students in the Eleventh District. Among them was a new conference to help teachers prepare students for advanced placement in economics. The Bank also encouraged the study of economics by sponsoring a student essay contest and the Fed Challenge competition.

The Dallas Fed's Community Affairs division provided information on public/private partnerships, resources and innovative models that help promote community and economic development and fair and impartial access to credit. The Bank cosponsored a national conference on business access to capital and credit and held a District symposium on transportation's importance to rural economic development.

Senior Management

From left:

Joel L. Koonce, Jr.
Personnel Services

J. Tyrone Gholson
Cash, Securities, Customer Services, Operations Analysis and TreasuryDirect

Robert Smith III
Houston Branch

Millard E. Sweatt
Legal, Protection and Services

Luther E. Richards
San Antonio Branch (Acting)

Robert D. McTeer, Jr.
President and CEO

Robert D. Hankins
Banking Supervision, Discount and Credit, and Financial Industry Studies

Helen E. Holcomb
First Vice President and COO

Larry J. Reck
Information Technology Services and Payments Services

Sam C. Clay
El Paso Branch

W. Michael Cox
Chief Economist

Harvey Rosenblum
Research and Statistics

Not pictured:
James L. Stull
San Antonio Branch

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Dallas

Dudley K. Montgomery
President and CEO,
The Security State Bank of Pecos

Roger R. Hemminghaus
(Chairman) Chairman, Ultramar Diamond Shamrock Corp.

Kirk A. McLaughlin
President and CEO,
Security Bank

Gayle M. Earls
President and CEO,
The Independent BankersBank

Judy Ley Allen
Partner, Allen Investments

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(Deputy Chairman) Retired Second General Vice President, International Association of Bridge, Structural, Ornamental & Reinforcing Iron Workers

Julie Spicer England
Vice President,
Texas Instruments

H. B. Zachry, Jr.
Chairman and CEO,
H. B. Zachry Co.

Dan Angel
President, Stephen F. Austin State University

El Paso

Not pictured:
Beauregard Brite White
(Chairman Pro Tem)
Rancher, J. E. White, Jr. & Sons

Cecil E. Nix
International Brotherhood of Electrical Workers, Local 460

James D. Renfrow
President and CEO,
The Carlsbad National Bank

Melissa W. O'Rourke
President, Charlotte's Inc.

Gail Darling
CEO, Gail Darling Inc.

Lester L. Parker
Banker

Patricia Z. Holland-Branch
(Chairman) President and CEO, HB/PZH Commercial Environments Inc.

Houston

Richard Weekley
Chairman,
Weekley Development Co.

Malcolm Gillis
President, Rice University

Judith B. Craven
Physician/Administrator

Edward O. Gaylord *(Chairman)*
Chairman,
Jacintoport Terminal Co.

Alan R. Buckwalter III
Chairman and CEO,
Chase Bank of Texas

Peggy Pearce Caskey
(Chairman Pro Tem)
President, PPC Holdings LLC

Ray B. Nesbitt
Retired President,
Exxon Chemical Co.

San Antonio

Not pictured:
Ron R. Harris
(Chairman Pro Tem)
President and CEO,
Pervasive Software

R. Tom Roddy
Chairman, CaminoReal Bank

Marvin L. Ragsdale
President, Iron Workers' District Council of the State of Texas

Juliet V. Garcia
President, University of Texas at Brownsville

Arthur Emerson
Vice President/General Manager, KVDA-TV 60 Telemundo

Douglas G. Macdonald
President, South Texas National Bank

Patty Puig Mueller *(Chairman)*
Vice President/Finance,
Mueller Energetics Corp.

Federal Reserve Bank of Dallas Officers

Dallas

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President and CEO

Helen E. Holcomb
First Vice President and COO

W. Michael Cox
Senior Vice President and Chief Economist

J. Tyrone Gholson
Senior Vice President

Robert D. Hankins
Senior Vice President

Joel L. Koonce, Jr.
Senior Vice President

Larry J. Reck
Senior Vice President

Harvey Rosenblum
Senior Vice President and Director of Research

Millard E. Sweatt
Senior Vice President, General Counsel, Ethics Officer and Secretary

Earl Anderson
Vice President

Basil J. Asaro
Vice President

Gloria V. Brown
Vice President

Lyne H. Carter
Vice President

John V. Duca
Vice President and Senior Economist

Billy J. Dusek
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William C. Gruben
Vice President and Senior Economist

Kermit S. Harmon, Jr.
Vice President

Evan F. Koenig
Vice President and Senior Economist

Joanna O. Kolson
Vice President

Kenneth V. McKee
Vice President and General Auditor

Larry M. Snell
Vice President

W. Arthur Tribble
Vice President

Meredith N. Black
Assistant Vice President

Stephen P. A. Brown
Assistant Vice President and Senior Economist

Terry B. Campbell
Assistant Vice President

KaSandra Goulding
Assistant Vice President

Johnny L. Johnson
Assistant Vice President

C. LaVor Lym
Assistant Vice President

James R. McCullin
Assistant Vice President

Dean A. Pankonien
Assistant Vice President

John R. Phillips
Assistant Vice President

Larry C. Ripley
Assistant Vice President

Sharon A. Sweeney
Assistant Vice President, Associate General Counsel and Associate Secretary

Gayle Teague
Assistant Vice President

Michael N. Turner
Assistant Vice President

Nancy Vickrey
Assistant Vice President

Evelyn LV. Watkins
Assistant Vice President

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Assistant Vice President

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Assistant Vice President

Bob W. Williams
Assistant Vice President

E. Ann Worthy
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Jeffery W. Gunther
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Donald L. Jackson
Operations Officer

Kathy K. Johnsrud
Statistics Officer

Harvey R. Mitchell III
Operations Officer

William C. Morse, Jr.
Operations Officer

Lawrence G. Rex
Audit Officer

Mark A. Wynne
Research Officer

Mine Yücel
Research Officer

El Paso

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Vice President in Charge

J. Eloise Guinn
Assistant Vice President

Javier R. Jimenez
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Robert Smith III
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René G. Gonzales
Vice President

Luther E. Richards
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Richard J. Burda
Assistant Vice President

Robert W. Gilmer
Assistant Vice President

Daron D. Peschel
Operations Officer

Marilyn Snider
Operations Officer

San Antonio

James L. Stull
Senior Vice President in Charge

Taylor H. Barbee
Assistant Vice President

Richard A. Gutierrez
Assistant Vice President

Karen Ojeda Salisbury
Assistant Vice President

Effective January 1, 2000

Small Business and Agriculture Advisory Council

Stephen K. Balas
Owner and Pharmacist
Eagle Lake Drugstore and Home Health Care
Owner
Balas Farming Co.
Eagle Lake, Texas

Gilbert D. Gaedcke
Chairman and CEO
Gaedcke Equipment Co.
Houston

Robert D. Josserand
President
AzTx Cattle Co.
Hereford, Texas

Paula Lambert
Founder and President
Mozzarella Co.
Dallas

Robert W. Latimer
President
Adobe Corporate Capital LLC
San Antonio

Joe D. Mitchell
Shareholder, Director and President
Mitchell & Jenkins PC, Attorneys and Counselors at Law
Dallas

Bookman Peters*
Certified Public Accountant and Financial Consultant
Bryan, Texas

Timothy A. Shell
President
ExecuTrain of Houston Inc.
Houston

Steven R. Vandegrift
Chairman
Charitygift Services Inc.
Board Member and Past Chairman
Austin Software Council
Austin

**Resigned effective September 28, 1999.*

Federal Advisory Council Member

Richard W. Evans, Jr.
Chairman and CEO
Frost National Bank
San Antonio

Effective December 31, 1999

February 10, 2000

To the Board of Directors of the
Federal Reserve Bank of Dallas:

The management of the Federal Reserve Bank of Dallas (FRBD) is responsible for the preparation and fair presentation of the Statement of Condition, Statement of Income, and Statement of Changes in Capital as of December 31, 1999 (the "Financial Statements"). The Financial Statements have been prepared in conformity with the accounting principles, policies, and practices established by the Board of Governors of the Federal Reserve System and as set forth in the Financial Accounting Manual for the Federal Reserve Banks, and as such, include amounts, some of which are based on judgments and estimates of management.

The management of the FRBD is responsible for maintaining an effective process of internal controls over financial reporting including the safeguarding of assets as they relate to the Financial Statements. Such internal controls are designed to provide reasonable assurance to management and to the Board of Directors regarding the preparation of reliable Financial Statements. This process of internal controls contains self-monitoring mechanisms, including, but not limited to, divisions of responsibility and a code of conduct. Once identified, any material deficiencies in the process of internal controls are reported to management, and appropriate corrective measures are implemented.

Even an effective process of internal controls, no matter how well designed, has inherent limitations, including the possibility of human error, and therefore can provide only reasonable assurance with respect to the preparation of reliable Financial Statements.

The management of the FRBD assessed its process of internal controls over financial reporting including the safeguarding of assets reflected in the Financial Statements, based upon the criteria established in the "Internal Control–Integrated Framework" issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, the management of the FRBD believes that the FRBD maintained an effective process of internal controls over financial reporting including the safeguarding of assets as they relate to the Financial Statements.

Robert D. McTeer, Jr.
President
Federal Reserve Bank of Dallas

Helen E. Holcomb
First Vice President
Federal Reserve Bank of Dallas

REPORT OF INDEPENDENT ACCOUNTANTS

To the Board of Directors of the
Federal Reserve Bank of Dallas:

We have examined management's assertion that the Federal Reserve Bank of Dallas ("FRB Dallas") maintained effective internal control over financial reporting and the safeguarding of assets as they relate to the Financial Statements as of December 31, 1999, included in the accompanying Management's Assertion.

Our examination was made in accordance with standards established by the American Institute of Certified Public Accountants, and accordingly, included obtaining an understanding of the internal control over financial reporting, testing, and evaluating the design and operating effectiveness of the internal control, and such other procedures as we considered necessary in the circumstances. We believe that our examination provides a reasonable basis for our opinion.

Because of inherent limitations in any internal control, misstatements due to error or fraud may occur and not be detected. Also, projections of any evaluation of the internal control over financial reporting to future periods are subject to the risk that the internal control may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

In our opinion, management's assertion that the FRB Dallas maintained effective internal control over financial reporting and over the safeguarding of assets as they relate to the Financial Statements as of December 31, 1999, is fairly stated, in all material respects, based upon criteria described in "Internal Control–Integrated Framework" issued by the Committee of Sponsoring Organizations of the Treadway Commission.

Dallas, Texas
March 3, 2000

REPORT OF INDEPENDENT ACCOUNTANTS

To the Board of Governors of the Federal Reserve System
and the Board of Directors of the Federal Reserve Bank of Dallas:

We have audited the accompanying statements of condition of the Federal Reserve Bank of Dallas (the "Bank") as of December 31, 1999 and 1998, and the related statements of income and changes in capital for the years then ended. These financial statements are the responsibility of the Bank's management. Our responsibility is to express an opinion on the Financial Statements based on our audits.

We conducted our audits in accordance with auditing standards generally accepted in the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

As discussed in Note 3, the financial statements were prepared in conformity with the accounting principles, policies, and practices established by the Board of Governors of the Federal Reserve System. These principles, policies, and practices, which were designed to meet the specialized accounting and reporting needs of the Federal Reserve System, are set forth in the "Financial Accounting Manual for Federal Reserve Banks" and constitute a comprehensive basis of accounting other than accounting principles generally accepted in the United States.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Bank as of December 31, 1999 and 1998, and results of its operations for the years then ended, on the basis of accounting described in Note 3.

PricewaterhouseCoopers LLP

Dallas, Texas
March 3, 2000

Statements of Condition (in millions)

	December 31, 1999	December 31, 1998
ASSETS		
Gold certificates	$ 575	$ 530
Special drawing rights certificates	341	367
Coin	16	40
Items in process of collection	296	392
Loans to depository institutions	10	—
U.S. government and federal agency securities, net	24,112	20,764
Investments denominated in foreign currencies	616	1,029
Accrued interest receivable	243	196
Interdistrict settlement account	—	1,680
Bank premises and equipment, net	178	182
Other assets	15	18
Total assets	$ 26,402	$ 25,198
LIABILITIES AND CAPITAL		
Liabilities		
Federal Reserve notes outstanding, net	$ 15,269	$ 23,072
Deposits:		
Depository institutions	1,246	1,166
Other deposits	6	9
Deferred credit items	269	334
Surplus transfer due U.S. Treasury	44	103
Interdistrict settlement account	9,087	—
Accrued benefit cost	51	49
Other liabilities	8	11
Total liabilities	$ 25,980	$ 24,744
Capital		
Capital paid-in	211	227
Surplus	211	227
Total capital	$ 422	$ 454
Total liabilities and capital	$ 26,402	$ 25,198

The accompanying notes are an integral part of these financial statements.

Statements of Income (in millions)

	FOR THE YEARS ENDED December 31, 1999	December 31, 1998
INTEREST INCOME		
Interest on U.S. government and federal agency securities	$ 1,332	$ 1,136
Interest on foreign currencies	9	23
Total interest income	$ 1,341	$ 1,159
OTHER OPERATING INCOME		
Income from services	$ 56	$ 56
Reimbursable services to government agencies	11	11
Foreign currency gains (losses), net	(19)	97
U.S. government securities gains (losses), net	(1)	2
Other income	1	1
Total other operating income	$ 48	$ 167
OPERATING EXPENSES		
Salaries and other benefits	$ 85	$ 81
Occupancy expense	12	11
Equipment expense	11	10
Assessments by Board of Governors	31	27
Other expenses	50	54
Total operating expenses	$ 189	$ 183
Net income prior to distribution	$ 1,200	$ 1,143
DISTRIBUTION OF NET INCOME		
Dividends paid to member banks	$ 13	$ 14
Transferred (from) surplus	(16)	(43)
Payments to U.S. Treasury as interest on Federal Reserve notes	1,203	441
Payments to U.S. Treasury as required by statute	—	731
Total distribution	$ 1,200	$ 1,143

The accompanying notes are an integral part of these financial statements.

Statements of Changes in Capital For the Years Ended December 31, 1999, and December 31, 1998 (in millions)

	Capital Paid-In	Surplus	Total Capital
BALANCE AT JANUARY 1, 1998 (5.6 MILLION SHARES)	$ 283	$ 270	$ 553
Net income transferred (from) surplus	—	(43)	(43)
Net change in capital stock (redeemed) (1.1 million shares)	(56)	—	(56)
BALANCE AT DECEMBER 31, 1998 (4.5 MILLION SHARES)	$ 227	$ 227	$ 454
Net income transferred (from) surplus	—	(16)	(16)
Net change in capital stock (redeemed) (0.3 million shares)	(16)	—	(16)
BALANCE AT DECEMBER 31, 1999 (4.2 MILLION SHARES)	$ 211	$ 211	$ 422

The accompanying notes are an integral part of these financial statements.

Notes to Financial Statements

1. ORGANIZATION

The Federal Reserve Bank of Dallas ("Bank") is part of the Federal Reserve System ("System") created by Congress under the Federal Reserve Act of 1913 ("Federal Reserve Act"), which established the central bank of the United States. The System consists of the Board of Governors of the Federal Reserve System ("Board of Governors") and 12 Federal Reserve Banks ("Reserve Banks"). The Reserve Banks are chartered by the federal government and possess a unique set of governmental, corporate, and central bank characteristics. Other major elements of the System are the Federal Open Market Committee ("FOMC") and the Federal Advisory Council. The FOMC is composed of members of the Board of Governors, the president of the Federal Reserve Bank of New York ("FRBNY"), and, on a rotating basis, four other Reserve Bank presidents.

Structure

The Bank and its branches in El Paso, Houston, and San Antonio serve the Eleventh Federal Reserve District, which includes Texas and portions of Louisiana and New Mexico. In accordance with the Federal Reserve Act, supervision and control of the Bank are exercised by a board of directors. Banks that are members of the System include all national banks and any state-chartered bank that applies and is approved for membership in the System.

Board of Directors

The Federal Reserve Act specifies the composition of the board of directors for each of the Reserve Banks. Each board is composed of nine members serving three-year terms: three directors, including those designated as chairman and deputy chairman, are appointed by the Board of Governors, and six directors are elected by member banks. Of the six elected by member banks, three represent the public and three represent member banks. Member banks are divided into three classes according to size. Member banks in each class elect one director representing member banks and one representing the public. In any election of directors, each member bank receives one vote, regardless of the number of shares of Reserve Bank stock it holds.

2. OPERATIONS AND SERVICES

The System performs a variety of services and operations. Functions include formulating and conducting monetary policy; participating actively in the payments mechanism, including large-dollar transfers of funds, automated clearinghouse operations, and check processing; distributing coin and currency; providing fiscal agency functions for the U.S. Treasury and certain federal agencies; serving as the federal government's bank; providing short-term loans to depository institutions; serving the consumer and the community by providing educational materials and information regarding consumer laws; supervising bank holding companies and state member banks; and administering other regulations of the Board of Governors. The Board of Governors' operating costs are funded through assessments on the Reserve Banks.

The FOMC establishes policy regarding open market operations, oversees these operations, and issues authorizations and directives to the FRBNY for its execution of transactions. Authorized transaction types include direct purchase and sale of securities, matched sale–purchase transactions, purchase of securities under agreements to resell, and lending of U.S. government securities. Additionally, the FRBNY is authorized by the FOMC to hold balances of, and to execute spot and forward foreign exchange and securities contracts in, 14 foreign currencies; maintain reciprocal currency arrangements ("F/X swaps") with various central banks; and "warehouse" foreign currencies for the U.S. Treasury and Exchange Stabilization Fund ("ESF") through the Reserve Banks.

3. SIGNIFICANT ACCOUNTING POLICIES

Accounting principles for entities with the unique powers and responsibilities of the nation's central bank have not been formulated by the Financial Accounting Standards Board. The Board of Governors has developed specialized accounting principles and practices that it believes are appropriate for the significantly different nature and function of a central bank as compared with the private sector. These accounting principles and practices are documented in the "Financial Accounting Manual for Federal Reserve Banks" ("Financial Accounting Manual"), which is issued by the Board of Governors. All Reserve Banks are required to adopt and apply accounting policies and practices that are consistent with the Financial Accounting Manual.

The financial statements have been prepared in accordance with the Financial Accounting Manual. Differences exist between the accounting principles and practices of the System and generally accepted accounting principles ("GAAP") in the United States. The primary differences are the presentation of all security holdings at amortized cost rather than at the fair value presentation requirements of GAAP, and the accounting for matched sale–purchase transactions as separate sales and purchases rather than secured borrowings with pledged collateral, as is required by GAAP. In addition, the Bank has elected not to include a Statement of Cash Flows or a Statement of Comprehensive Income. The Statement of Cash Flows has not been included, as the liquidity and cash position of the Bank are not of primary concern to users of these financial statements. The Statement of Comprehensive Income, which comprises net income plus or minus certain adjustments, such as the fair value adjustment for securities, has not been included because, as stated above, the securities are recorded at amortized cost and there are no other adjustments in the determination of Comprehensive Income applicable to the Bank. Other information regarding the Bank's activities is provided in, or may be derived from, the Statements of Condition, Income, and Changes in Capital. Therefore, a Statement of Cash Flows or a Statement of Comprehensive Income would not provide any additional useful information. There are no other significant differences between the policies outlined in the Financial Accounting Manual and GAAP.

The preparation of the financial statements in conformity with the Financial Accounting Manual requires management to make certain estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of income and expenses during the reporting period. Actual results could differ from those estimates. Unique accounts and significant accounting policies are explained below.

a. Gold Certificates

The Secretary of the Treasury is authorized to issue gold certificates to the Reserve Banks to monetize gold held by the U.S. Treasury. Payment for the gold certificates by the Reserve Banks is made by crediting equivalent amounts in dollars into the account established for the U.S. Treasury. These gold certificates held by the Reserve Banks are required to be backed by the gold of the U.S. Treasury. The U.S. Treasury may reacquire the gold certificates at any time, and the Reserve Banks must deliver them to the U.S. Treasury. At such time, the U.S. Treasury's account is charged and the Reserve Banks' gold certificate accounts are lowered. The value of gold for purposes of backing the gold certificates is set by law at $42-2/9 a fine troy ounce. The Board of Governors allocates the gold certificates among Reserve Banks once a year based upon Federal Reserve notes outstanding in each District at the end of the preceding year.

b. Special Drawing Rights Certificates

Special drawing rights ("SDRs") are issued by the International Monetary Fund ("Fund") to its members in proportion to each member's quota in the Fund at the time of issuance. SDRs serve as a supplement to international monetary reserves and may be transferred from one national monetary authority to another. Under the law providing for U.S. participation in the SDR system, the Secretary of the U.S. Treasury is authorized to issue SDR certificates, somewhat like gold certificates, to the Reserve Banks. At such time, equivalent amounts in dollars are credited to the account established for the U.S. Treasury, and the Reserve Banks' SDR certificate accounts are increased. The Reserve Banks are required to purchase SDRs, at the direction of the U.S. Treasury, for the purpose of financing SDR certificate acquisitions or for financing exchange stabilization operations. The Board of Governors allocates each SDR transaction among Reserve Banks based upon Federal Reserve notes outstanding in each District at the end of the preceding year.

c. Loans to Depository Institutions

The Depository Institutions Deregulation and Monetary Control Act of 1980 provides that all depository institutions that maintain reservable transaction accounts or nonpersonal time deposits, as defined in Regulation D issued by the Board of Governors, have borrowing privileges at the discretion of the Reserve Banks. Borrowers execute certain lending agreements and deposit sufficient collateral before credit is extended. Loans are evaluated for collectibility, and currently all are considered collectible and fully collateralized. If any loans were deemed to be uncollectible, an appropriate reserve would be established. Interest is recorded on the accrual basis and is charged at the applicable discount rate established at least every 14 days by the boards of directors of the Reserve Banks, subject to review by the Board of Governors. However, Reserve Banks retain the option to impose a surcharge above the basic rate in certain circumstances.

The Board of Governors established a Special Liquidity Facility (SLF) to make discount window credit readily available to depository institutions in sound financial condition around the century date change (October 1, 1999, to April 7, 2000) in order to meet unusual liquidity demands and to allow institutions to confidently commit to supplying loans to other institutions and businesses during this period. Under the SLF, collateral requirements are unchanged from normal discount window activity and loans are made at a rate of 150 basis points above FOMC's target federal funds rate.

d. U.S. Government and Federal Agency Securities and Investments Denominated in Foreign Currencies

The FOMC has designated the FRBNY to execute open market transactions on its behalf and to hold the resulting securities in the portfolio known as the System Open Market Account ("SOMA"). In addition to authorizing and directing operations in the domestic securities market, the FOMC authorizes and directs the FRBNY to execute operations in foreign markets for major currencies in order to counter disorderly conditions in exchange markets or to meet other needs specified by the FOMC in carrying out the System's central bank responsibilities.

Purchases of securities under agreements to resell and matched sale–purchase transactions are accounted for as separate sale and purchase transactions. Purchases under agreements to resell are transactions in which the FRBNY purchases a security and sells it back at the rate specified at the commencement of the transaction. Matched sale–purchase transactions are transactions in which the FRBNY sells a security and buys it back at the rate specified at the commencement of the transaction.

Effective April 26, 1999, FRBNY was given sole authorization by the FOMC to lend U.S. government securities held in the SOMA to U.S. government securities dealers and to banks participating in U.S. government securities clearing arrangements, in order to facilitate the effective functioning of the domestic securities market. These securities-lending transactions are fully collateralized by other U.S. government securities. FOMC policy requires FRBNY to take possession of collateral in amounts in excess of the market values of the securities loaned. The market values of the collateral and the securities loaned are monitored by FRBNY on a daily basis, with additional collateral obtained as necessary. The securities loaned continue to be accounted for in the SOMA. Prior to April 26, 1999, all Reserve Banks were authorized to engage in such lending activity.

Foreign exchange contracts are contractual agreements between two parties to exchange specified currencies at a specified price on a specified date. Spot foreign contracts normally settle two days after the trade date, whereas the settlement date on forward contracts is negotiated between the contracting parties, but will extend beyond two days from the trade date. The FRBNY generally enters into spot contracts, with any forward contracts generally limited to the second leg of a swap/warehousing transaction.

The FRBNY, on behalf of the Reserve Banks, maintains renewable, short-term F/X swap arrangements with authorized foreign central banks. The parties agree to exchange their currencies up to a prearranged maximum amount and for an agreed-upon period of time (up to 12 months) at an agreed-upon interest rate. These arrangements give the FOMC temporary access to foreign currencies that it may need for intervention operations to support the dollar and give the partner foreign central bank temporary access to dollars it may need to support its own currency. Drawings under the F/X swap arrangements can be initiated by either the FRBNY or the partner foreign central bank, and must be agreed to by the drawee. The F/X swaps are structured so that the party initiating the transaction (the drawer) bears the exchange rate risk upon maturity. The FRBNY will generally invest the foreign currency received under an F/X swap in interest-bearing instruments.

Warehousing is an arrangement under which the FOMC agrees to exchange, at the request of the Treasury, U.S. dollars for foreign currencies held by the Treasury or ESF over a limited period of time. The purpose of the warehousing facility is to supplement the U.S. dollar resources of the Treasury and ESF for financing purchases of foreign currencies and related international operations.

In connection with its foreign currency activities, the FRBNY, on behalf of the Reserve Banks, may enter into contracts that contain varying degrees of off-balance sheet market risk, because they represent contractual commitments involving future settlement, and counterparty credit risk. The FRBNY controls credit risk by obtaining credit approvals, establishing transaction limits, and performing daily monitoring procedures.

While the application of current market prices to the securities currently held in the SOMA portfolio and investments denominated in foreign currencies may result in values substantially above or below their carrying values, these unrealized changes in value would have no direct effect on the quantity of reserves available to the banking system or on the prospects for future Reserve Bank earnings or capital. Both the domestic and foreign components of the SOMA portfolio from time to time involve transactions that can result in gains or losses when holdings are sold prior to maturity. However, decisions regarding the securities and foreign currencies transactions, including their purchase and sale, are motivated by monetary policy objectives rather than profit. Accordingly, earnings and any gains or losses resulting from the sale of such currencies and securities are incidental to the open market operations and do not motivate its activities or policy decisions.

U.S. government and federal agency securities and investments denominated in foreign currencies comprising the SOMA are recorded at cost, on a settlement-date basis, and adjusted for amortization of premiums or accretion of discounts on a straight-line basis. Interest income is accrued on a straight-line basis and is reported as "Interest on U.S. government securities and federal agency securities" or "Interest on foreign currencies," as appropriate. Income earned on securities-lending transactions is reported as a component of "Other income." Gains and losses resulting from sales of securities are determined by specific issues based on average cost. Gains and losses on the sales of U.S. government and federal agency securities are reported as "U.S. government securities gains (losses), net." Foreign-currency-denominated assets are revalued monthly at current market exchange rates in order to report these assets in U.S. dollars. Realized and unrealized gains and losses on investments denominated in foreign currencies are reported as "Foreign currency gains (losses), net." Foreign currencies held through F/X swaps, when initiated by the counterparty, and warehousing arrangements are revalued monthly, with the unrealized gain or loss reported by the FRBNY as a component of "Other assets" or "Other liabilities," as appropriate.

Balances of U.S. government and federal agency securities bought outright, investments denominated in foreign currency, interest income, amortization of premiums and discounts on securities bought outright, gains and losses on sales of securities, and realized and unrealized gains and losses on investments denominated in foreign currencies, excluding those held under an F/X swap arrangement, are allocated to each Reserve Bank. Effective April 26, 1999, income from securities lending transactions undertaken by FRBNY was also allocated to each Reserve Bank. Securities purchased under agreements to resell and unrealized gains and losses on the revaluation of foreign currency holdings under F/X swaps and warehousing arrangements are allocated to the FRBNY and not to other Reserve Banks.

e. Bank Premises and Equipment

Bank premises and equipment are stated at cost less accumulated depreciation. Depreciation is calculated on a straight-line basis over estimated useful lives of assets ranging from 2 to 50 years. New assets, major alterations, renovations, and improvements are capitalized at cost as additions to the asset accounts. Maintenance, repairs, and minor replacements are charged to operations in the year incurred.

f. Interdistrict Settlement Account

At the close of business each day, all Reserve Banks and branches assemble the payments due to or from other Reserve Banks and branches as a result of transactions involving accounts residing in other Districts that occurred during the day's operations. Such transactions may include funds settlement, check clearing and automated clearinghouse ("ACH") operations, and allocations of shared expenses. The cumulative net amount due to or from other Reserve Banks is reported as the "Interdistrict settlement account."

g. Federal Reserve Notes

Federal Reserve notes are the circulating currency of the United States. These notes are issued through the various Federal Reserve Agents to the Reserve Banks upon deposit with such Agents of certain classes of collateral security, typically U.S. government securities. These notes are identified as issued to a specific Reserve Bank. The Federal Reserve Act provides that the collateral security tendered by the Reserve Bank to the Federal Reserve Agent must be equal to the sum of the notes applied for by such Reserve Bank. In accordance with the Federal Reserve Act, gold certificates, special drawing rights certificates, U.S. government and agency securities, loans, and investments denominated in foreign currencies are pledged as collateral for net Federal Reserve notes outstanding. The collateral value is equal to the book value of the collat-

eral tendered, with the exception of securities, whose collateral value is equal to the par value of the securities tendered. The Board of Governors may, at any time, call upon a Reserve Bank for additional security to adequately collateralize the Federal Reserve notes. The Reserve Banks have entered into an agreement that provides for certain assets of the Reserve Banks to be jointly pledged as collateral for the Federal Reserve notes of all Reserve Banks in order to satisfy their obligation of providing sufficent collateral for outstanding Federal Reserve notes. In the event that this collateral is insufficient, the Federal Reserve Act provides that Federal Reserve notes become a first and paramount lien on all the assets of the Reserve Banks. Finally, as obligations of the United States, Federal Reserve notes are backed by the full faith and credit of the U.S. government.

The "Federal Reserve notes outstanding, net" account represents Federal Reserve notes reduced by cash held in the vaults of the Bank of $21,412 million and $10,606 million at December 31, 1999, and December 31, 1998, respectively.

h. Capital Paid-in

The Federal Reserve Act requires that each member bank subscribe to the capital stock of the Reserve Bank in an amount equal to 6 percent of the capital and surplus of the member bank. As a member bank's capital and surplus change, its holdings of the Reserve Bank's stock must be adjusted. Member banks are those state-chartered banks that apply and are approved for membership in the System and all national banks. Currently, only one-half of the subscription is paid-in, and the remainder is subject to call. These shares are nonvoting, with a par value of $100. They may not be transferred or hypothecated. By law, each member bank is entitled to receive an annual dividend of 6 percent on the paid-in capital stock. This cumulative dividend is paid semiannually. A member bank is liable for Reserve Bank liabilities up to twice the par value of stock subscribed by it.

i. Surplus

The Board of Governors requires Reserve Banks to maintain a surplus equal to the amount of capital paid-in as of December 31. This amount is intended to provide additional capital and reduce the possibility that the Reserve Banks would be required to call on member banks for additional capital. Reserve Banks are required by the Board of Governors to transfer to the U.S. Treasury excess earnings, after providing for the costs of operations, payment of dividends, and reservation of an amount necessary to equate surplus with capital paid-in.

The Omnibus Budget Reconciliation Act of 1993 (Public Law 103-66, Section 3002) codified the existing Board surplus policies as statutory surplus transfers, rather than as payments of interest on Federal Reserve notes, for federal government fiscal years 1998 and 1997 (which ended on September 30, 1998, and September 30, 1997, respectively). In addition, the legislation directed the Reserve Banks to transfer to the U.S. Treasury additional surplus funds of $107 million and $106 million during fiscal years 1998 and 1997, respectively. Reserve Banks were not permitted to replenish surplus for these amounts during this time. Payments to the U.S. Treasury made after September 30, 1998, represent payment of interest on Federal Reserve notes outstanding.

The Consolidated Appropriations Act of 1999 (Public Law 106-113, Section 302) directed the Reserve Banks to transfer to the U.S. Treasury additional surplus funds of $3,752 million during the federal government's 2000 fiscal year. The Reserve Banks will make this payment prior to September 30, 2000.

In the event of losses, payments to the U.S. Treasury are suspended until such losses are recovered through subsequent earnings. Weekly payments to the U.S. Treasury vary significantly.

j. Income and Cost Related to Treasury Services

The Bank is required by the Federal Reserve Act to serve as fiscal agent and depository of the United States. By statute, the Department of the Treasury is permitted, but not required, to pay for these services. The costs of providing fiscal agency and depository services to the Treasury Department that have been billed but not paid are immaterial and included in "Other expenses."

k. Taxes

The Reserve Banks are exempt from federal, state, and local taxes, except for taxes on real property, which are reported as a component of "Occupancy expense."

4. U.S. GOVERNMENT AND FEDERAL AGENCY SECURITIES

Securities bought outright and held under agreements to resell are held in the SOMA at the FRBNY. An undivided interest in SOMA activity, with the exception of securities held under agreements to resell and the related premiums, discounts, and income, is allocated to each Reserve Bank on a percentage basis derived from an annual settlement of interdistrict clearings. The settlement, performed in April of each year, equalizes Reserve Bank gold certificate holdings to Federal Reserve notes outstanding. The Bank's allocated share of SOMA balances was approximately 4.983 percent and 4.547 percent at December 31, 1999, and December 31, 1998, respectively.

The Bank's allocated share of securities held in the SOMA at December 31 that were bought outright, was as follows (in millions):

	1999	1998
Par value:		
Federal agency	$ 9	$ 15
U.S. government		
Bills	8,795	8,856
Notes	10,886	8,543
Bonds	4,135	3,159
Total par value	$23,825	$ 20,573
Unamortized premiums	453	336
Unaccreted discounts	(166)	(145)
Total allocated to Bank	$24,112	$20,764

Total SOMA securities bought outright were $483,902 million and $456,667 million at December 31, 1999, and December 31, 1998, respectively.

The maturities of U.S. government and federal agency securities bought outright, which were allocated to the Bank at December 31, 1999, were as follows (in millions):

	Par value		
Maturities of Securities Held	U.S. Government Securities	Federal Agency Obligations	Total
Within 15 days	$ 231	$ —	$ 231
16 days to 90 days	4,580	2	4,582
91 days to 1 year	6,969	1	6,970
Over 1 year to 5 years	6,187	—	6,187
Over 5 years to 10 years	2,547	6	2,553
Over 10 years	3,302	—	3,302
Total	$23,816	$ 9	$23,825

At December 31, 1999, and December 31, 1998, matched sale–purchase transactions involving U.S. government securities with par values of $39,182 million and $20,927 million, respectively, were outstanding, of which $1,952 million and $952 million were allocated to the Bank. Matched sale–purchase transactions are generally overnight arrangements.

5. INVESTMENTS DENOMINATED IN FOREIGN CURRENCIES

The FRBNY, on behalf of the Reserve Banks, holds foreign currency deposits with foreign central banks and the Bank for International Settlements and invests in foreign government debt instruments. Foreign government debt instruments held include both securities bought outright and securities held under agreements to resell. These investments are guaranteed as to principal and interest by the foreign governments.

Each Reserve Bank is allocated a share of foreign-currency-denominated assets, the related interest income, and realized and unrealized foreign currency gains and losses, with the exception of unrealized gains and losses on F/X swaps and warehousing transactions. This allocation is based on the ratio of each Reserve Bank's capital and surplus to aggregate capital and surplus at the preceding December 31. The Bank's allocated share of investments denominated in foreign currencies was approximately 3.818 percent and 5.203 percent at December 31, 1999, and December 31, 1998, respectively.

The Bank's allocated share of investments denominated in foreign currencies, valued at current exchange rates at December 31, was as follows (in millions):

	1999	1998
German marks:		
Foreign currency deposits	$ —	$ 544
Government debt instruments including agreements to resell	—	123
European Union euro:		
Foreign currency deposits	165	—
Government debt instruments including agreements to resell	97	—
Japanese yen:		
Foreign currency deposits	12	35
Government debt instruments including agreements to resell	340	322
Accrued interest	2	5
Total	$ 616	$ 1,029

Total investments denominated in foreign currencies were $16,140 million and $19,769 million at December 31, 1999, and December 31, 1998, respectively. The 1998 balance includes $15 million in unearned interest collected on certain foreign currency holdings that is allocated solely to the FRBNY.

The maturities of investments denominated in foreign currencies that were allocated to the Bank at December 31, 1999, were as follows (in millions):

Maturities of Investments Denominated in Foreign Currencies	
Within 1 year	$ 575
Over 1 year to 5 years	19
Over 5 years to 10 years	22
Total	$ 616

At December 31, 1999, and December 31, 1998, there were no open foreign exchange contracts or outstanding F/X swaps.

At December 31, 1999, and December 31, 1998, the warehousing facility was $5,000 million, with nothing outstanding.

6. BANK PREMISES AND EQUIPMENT

A summary of bank premises and equipment at December 31 is as follows (in millions):

	1999	1998
Bank premises and equipment:		
Land	$ 32	$ 32
Buildings	116	115
Building machinery and equipment	26	24
Construction in progress	1	2
Furniture and equipment	80	77
	255	250
Accumulated depreciation	(77)	(68)
Bank premises and equipment, net	$178	$ 182

Depreciation expense was $11 million for each of the years ended December 31, 1999, and December 31, 1998.

7. COMMITMENTS AND CONTINGENCIES

At December 31, 1999, the Bank was obligated under noncancelable leases for premises and equipment with terms ranging from one to approximately five years. These leases provide for increased rentals based upon increases in real estate taxes, operating costs, or selected price indices.

Rental expense under operating leases for certain operating facilities, warehouses, and data processing and office equipment (including taxes, insurance, and maintenance when included in rent), net of sublease rentals, was $484,000 and $399,000 for the years ended December 31, 1999, and December 31, 1998, respectively. Certain of the Bank's leases have options to renew.

Future minimum rental payments under noncancelable operating leases with terms of one year or more at December 31, 1999, were as follows (in thousands):

	Operating
2000	$ 365
2001	357
2002	357
2003	78
2004	7
Thereafter	—
Total	$ 1,164

At December 31, 1999, there were no other commitments and long-term obligations in excess of one year.

Under the Insurance Agreement of the Federal Reserve Banks dated March 2, 1999, each of the Reserve Banks has agreed to bear, on a per-incident basis, a pro rata share of losses in excess of 1 percent of the capital paid-in of the claiming Reserve Bank, up to 50 percent of the total capital paid-in of all Reserve Banks. Losses are borne in the ratio that a Reserve Bank's capital paid-in bears to the total capital paid-in of all Reserve Banks at the beginning of the calendar year in which the loss is shared. No claims were outstanding under such agreement at December 31, 1999, or December 31, 1998.

The Bank is involved in certain legal actions and claims arising in the ordinary course of business. Although it is difficult to predict the ultimate outcome of these actions, in management's opinion, based on discussions with counsel, the aforementioned litigation and claims will be resolved without material adverse effect on the financial position or results of operations of the Bank.

8. RETIREMENT AND THRIFT PLANS

Retirement Plans

The Bank currently offers two defined benefit retirement plans to its employees, based on length of service and level of compensation. Substantially all of the Bank's employees participate in the Retirement Plan for Employees of the Federal Reserve System ("System Plan") and the Benefit Equalization Retirement Plan ("BEP"). The System Plan is a multi-employer plan with contributions fully funded by participating employers. No separate accounting is maintained of assets contributed by the participating employers. The Bank's projected benefit obligation and net pension costs for the BEP at December 31, 1999, and December 31, 1998, and for the years then ended, are not material.

Thrift Plan

Employees of the Bank may also participate in the defined contribution Thrift Plan for Employees of the Federal Reserve System ("Thrift Plan"). The Bank's Thrift Plan contributions totaled $3 million for each of the years ended December 31, 1999, and December 31, 1998, respectively, and are reported as a component of "Salaries and other benefits."

9. POSTRETIREMENT BENEFITS OTHER THAN PENSIONS AND POSTEMPLOYMENT BENEFITS

Postretirement Benefits Other Than Pensions

In addition to the Bank's retirement plans, employees who have met certain age and length-of-service requirements are eligible for both medical benefits and life insurance coverage during retirement.

The Bank funds benefits payable under the medical and life insurance plans as due and, accordingly, has no plan assets. Net postretirement benefit cost is actuarially determined, using a January 1 measurement date.

Following is a reconciliation of beginning and ending balances of the benefit obligation (in millions):

	1999	1998
Accumulated postretirement benefit obligation at January 1	$36.7	$40.2
Service cost—benefits earned during the period	1.3	1.4
Interest cost of accumulated benefit obligation	2.2	2.7
Actuarial loss (gain)	(6.6)	2.9
Contributions by plan participants	0.3	0.3
Benefits paid	(1.2)	(1.2)
Plan amendments, acquisitions, foreign currency exchange rate changes, business combinations, divestitures, curtailments, settlements, special termination benefits	—	(9.6)
Accumulated postretirement benefit obligation at December 31	$32.7	$36.7

Following is a reconciliation of the beginning and ending balance of the plan assets, the unfunded postretirement benefit obligation, and the accrued postretirement benefit cost (in millions):

	1999	1998
Fair value of plan assets at January 1	$ —	$ —
Actual return on plan assets	—	—
Contributions by the employer	0.9	0.9
Contributions by plan participants	0.3	0.3
Benefits paid	(1.2)	(1.2)
Fair value of plan assets at December 31	$ —	$ —
Unfunded postretirement benefit obligation	$32.7	$36.7
Unrecognized prior service cost	15.5	16.4
Unrecognized net actuarial gain (loss)	(3.1)	(9.9)
Accrued postretirement benefit cost	$45.1	$43.2

Accrued postretirement benefit cost is reported as a component of "Accrued benefit cost."

The weighted-average assumption used in developing the postretirement benefit obligation as of December 31, 1999, and December 31, 1998, was 7.5 percent and 6.25 percent, respectively.

For measurement purposes, an 8.75 percent annual rate of increase in the cost of covered health care benefits was assumed for 2000. Ultimately, the health care cost trend rate is expected to decrease gradually to 5.5 percent by 2006, and remain at that level thereafter.

Assumed health care cost trend rates have a significant effect on the amounts reported for health care plans. A 1 percentage point change in assumed health care cost trend rates would have the following effects for the year ended December 31, 1999 (in millions):

	1 Percentage Point Increase	1 Percentage Point Decrease
Effect on aggregate of service and interest cost components of net periodic postretirement benefit cost	$ 0.8	$ (0.6)
Effect on accumulated postretirement benefit obligation	1.7	(1.6)

The following is a summary of the components of net periodic postretirement benefit cost for the years ended December 31 (in millions):

	1999	1998
Service cost—benefits earned during the period	$ 1.3	$ 1.4
Interest cost of accumulated benefit obligation	2.2	2.7
Amortization of prior service cost	(1.0)	(0.5)
Recognized net actuarial loss	0.3	0.1
Net periodic postretirement benefit cost	$ 2.8	$ 3.7

Net periodic postretirement benefit cost is reported as a component of "Salaries and other benefits."

POSTEMPLOYMENT BENEFITS

The Bank offers benefits to former or inactive employees. Postemployment benefit costs are actuarially determined and include the cost of medical and dental insurance, survivor income, and disability benefits. Costs were projected using the same discount rate and health care trend rates as were used for projecting postretirement costs. The accrued postemployment benefit costs recognized by the Bank at December 31, 1999, and December 31, 1998, were $6 million each year. This cost is included as a component of "Accrued benefit cost." Net periodic postemployment benefit costs included in 1999 and 1998 operating expenses were $1 million each year.

Volume of Operations

(UNAUDITED)

	Number of Items Handled (Thousands)		Dollar Amount (Millions)	
	1999	1998	1999	1998
SERVICES TO DEPOSITORY INSTITUTIONS				
CASH SERVICES				
Federal Reserve notes processed	2,126,309	1,697,447	30,649	27,380
Currency received from circulation	1,958,586	1,789,661	60,357	27,779
Coin received from circulation	1,720,739	1,512,784	150	139
CHECK PROCESSING				
Commercial–processed	1,256,859	1,204,449	741,096	705,416
Commercial–fine sorted	143,445	193,347	47,638	72,545
U.S. government checks	23,533	26,236	22,834	24,893
ELECTRONIC PAYMENTS				
Automated Clearinghouse items originated	241,852	210,360	678,462	639,038
Funds transfers processed	12,346	11,686	14,623,121	16,097,218
Book-entry security transfers processed	96	155	1,845,114	2,452,537
LOANS				
Advances made	92*	59*	127	327
SERVICES TO THE U.S. TREASURY AND GOVERNMENT AGENCIES				
Issues and reinvestments of Treasury securities	11	14	736	892
Food coupons destroyed	2,691	2,251	14	12

*Individual loans, not in thousands.

About the Dallas Fed

The Federal Reserve Bank of Dallas is one of 12 regional Federal Reserve Banks in the United States. Together with the Board of Governors in Washington, D.C., these organizations form the Federal Reserve System and function as the nation's central bank. The System's basic purpose is to provide a flow of money and credit that will foster orderly economic growth and a stable dollar. In addition, Federal Reserve Banks supervise banks and bank holding companies and provide certain financial services to the banking industry, the federal government and the public.

The Federal Reserve Bank of Dallas has served the financial institutions in the Eleventh District since 1914. The District encompasses 350,000 square miles and comprises the state of Texas, northern Louisiana and southern New Mexico. The three branch offices of the Federal Reserve Bank of Dallas are in El Paso, Houston and San Antonio.

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