FEDERAL RESERVE BANK OF CLEVELAND

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2003 Annual Report

FEDERAL RESERVE BANK OF CLEVELAND 2003 ANNUAL REPORT

The Federal Reserve System is responsible for formulating and implementing U.S. monetary policy. It also supervises banks and bank holding companies, and provides financial services to depository institutions and the federal government.

The Federal Reserve Bank of Cleveland is one of 12 regional Reserve Banks in the United States that, together with the Board of Governors in Washington, DC, comprise the Federal Reserve System.

The Federal Reserve Bank of Cleveland, including its branch offices in Cincinnati and Pittsburgh and its check processing center in Columbus, serves the Fourth Federal Reserve District (Ohio, western Pennsylvania, the northern panhandle of West Virginia, and eastern Kentucky).

It is the policy of the Federal Reserve Bank of Cleveland to provide equal employment opportunity for all employees and applicants without regard to race, color, religion, sex, national origin, age, or disability.

Table of Contents

President's Foreword

What is the source of economic prosperity? In today's environment, where the slow pace of job creation tops the national agenda, it is tempting to answer that high-paying jobs lead to economic success. And in a region known for its industrial prowess, wouldn't those be *manufacturing* jobs? But that response begs the very question we seek to answer: how to get the most value from our resources over time.

The essay that follows examines the legacy and lessons of economic development during the last several hundred years, spanning agrarian, industrial, mass-production, and postindustrial economic systems. We conclude that education and flexibility are most important to stimulating innovation and economic growth. In an economic order marked by a growing and more diverse set of nations, invention is our greatest strength and flexibility our most valuable asset. Economic success comes from responding to the changes that innovation necessitates.

R. Chris Moore, first vice president; Robert W. Mahoney, chairman; and Sandra Pianalto, president.

The Federal Reserve Bank of Cleveland has not been immune to the challenge of change, but we are learning to embrace the opportunities those challenges present. In the "Operational Highlights" section of this report, we look at some of the ways that innovation and new technologies are transforming the payments system, and how these developments have altered the way we do business.

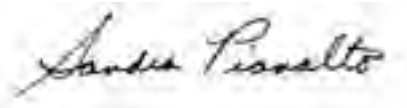
The trend that is sweeping our payments system is the substitution of electronics for paper. As the Federal Reserve System rationalizes and modernizes its check processing infrastructure, it is constructing a platform to capture checks earlier in the payments stream and convert them into electronic check images. The Federal Reserve is also facilitating electronic bill payment and presentment, helping investors to purchase U.S. savings bonds online, and speeding collections electronically for the U.S. Treasury.

The Federal Reserve Bank of Cleveland plays an important role in these projects, and to do so, we are hiring people with higher education and different skills than we did even a decade ago. We rely more on teams, and we benefit from putting better information into the hands of each employee. We value learning and the continuous improvement it brings.

Our Bank achieved many milestones last year—and that success would not have been possible without the guidance and support of our boards of directors in the Cleveland, Cincinnati, and Pittsburgh offices and the members of our advisory councils.

I am especially appreciative of the leadership of Robert W. Mahoney (retired chairman and chief executive officer, Diebold, Incorporated), who serves the Bank as chairman of the board. Mr. Mahoney also led the search committee that selected R. Chris Moore as our Bank's first vice president and chief operating officer. I also offer thanks to Cheryl L. Krueger (president and chief executive officer, Cheryl&Co.), who completed her second term of service on the Cleveland board in 2003. Ms. Krueger's valuable service to the Bank dates to 1995, when she began serving on our Business Advisory Council.

Finally, it is with heartfelt thanks that I recognize the officers and staff of the Federal Reserve Bank of Cleveland. In response to the whirlwind changes taking place in our industry, we are, together, reshaping the strategic direction of our organization to reflect a future of challenge, opportunity, and possibility. During this year—my first as the Bank's president—your unwavering support and continued dedication to our shared mission inspire me daily.



President
and Chief Executive Officer

Innovation, Growth, and Economic Policy in an Environment of Change

What is the source of economic prosperity?

This is the question that motivates all economic study—and it is more than just academic inquiry. Economics, ultimately, is about advocating policy. Whether we are atop the world stage or around the kitchen table, each of us is a policymaker trying to maximize our well-being using our limited means. The search for greater prosperity—what economist and historian Joel Mokyr aptly calls "the lever of riches"—is ubiquitous.

The idea of economic prosperity has a particular urgency here in the Fourth Federal Reserve District, where manufacturing jobs are giving way to the unrelenting pressures of an expanding service sector, foreign competition, and their own spectacular productivity growth. Indeed, our region has a ringside seat for the competitive struggle that will determine our nation's potential: the importance of innovation in spurring and sustaining growth, and the government's role in promoting the most conducive environment for that growth.

In this report, we explore innovation as the engine of economic prosperity and argue that the greatest strength we possess is our ability to induce and embrace change, from the integration of new technologies to new peoples and cultures. Indeed, if we hope to remain an ongoing, vital player in the global economy, flexibility is likely to be our most valuable asset.

"If you're not competing, you're dead."

Arnold Palmer

The Economics of Us and Them

Competition for precious resources is always and everywhere. It is the struggle that defines all life: Limited resources meet unlimited desires. And so we compete with one another, person with person, business with business, and nation with nation. At first glance, the marketplace appears destructive—that is, the elevation of one cannot be accomplished without a proportionate cost borne by another. This is the economics of *us versus them*, and it is this view that each of us sees from our individual vantage point. This perspective is limited, though, and tends to breed misunderstanding about competition and social welfare. Unfortunately, it is also the perspective that has motivated an array of economic "remedies" that, more often than not, have inhibited economic progress.

The predominant economic theory of the eighteenth century, mercantilism, was based on such a view. The mercantilists held that a nation's wealth lies in its stockpiles of precious metals. One road to economic prosperity is god given—some nations are simply endowed with a richer store of precious metals that need only be dug from the ground. But a nation might also create its own prosperity by accumulating precious metals through trade. At the heart of mercantilist economic policy are commercial controls aimed at promoting exports and suppressing imports.

In 1776, Adam Smith challenged the mercantilists' us-versus-them view in his monumental work, *An Inquiry into the Nature and Causes of the Wealth of Nations*. The mercantilist prescription of promoting exports and discouraging imports elevated the interests of the producer at the expense of the consumer, Smith argued, yet "consumption is the sole end and purpose of all production." No nation can hope to raise the prosperity of its citizens by encouraging them to produce what they could buy more cheaply elsewhere. But how can an environment as seemingly destructive as the marketplace be the basis for prosperity? The answer, said Smith, is specialization and trade:

> *If [they] can supply us with a commodity cheaper than we ourselves can make it, better buy it of them with some part of the produce of our own industry, employed in a way in which we have some advantage.*

Two important ideas here deserve emphasis. First, we gain from the marketplace by allocating our efforts to areas where we get the most bang for our buck. In other words, we want to produce those things that require the smallest sacrifice compared to others. When we each focus our abilities on our "comparative advantage," and then trade with those offering something different, both parties advance their welfare beyond what they could have attained in isolation.[1] The logic that both parties are made better off by trade is obvious: If each enters into the trade voluntarily, it is because what they offer is less valuable to them than what they receive in return.

The second key insight—a point the mercantilists missed—is that trade is symbiotic. If we wish to buy, we must also sell. We simply cannot do one without the other. This truth holds for nations just as it does for each of us individually, though it is often lost on us. It is hard to look beyond the "us versus them" of competition. When we see the production of a particular

1 David Ricardo (1817) is generally credited with the formal development of the idea of comparative advantage.

product moving to another location, perhaps even another nation, we are tempted to extrapolate that trend in isolation and wonder: What will become of us if all the jobs go away? But employment opportunities don't go away—they reappear in another form. We cannot buy if we do not sell *"from the produce of our own."* In the marketplace, the prosperity of each trading partner is inextricably linked. This is the economics of us *and* them, and it is the mechanism by which competition elevates overall prosperity.

Not everyone among "us," however, will share equally in the gains of competitive trade with "them." There will be casualties along the way. Those who carry the heaviest burdens—workers whose skills are at odds with economic reorganization—will find little comfort in the knowledge they are paying its inevitable and necessary costs. What is certain, though, is that the benefits flowing to the gainers will more than offset the losses of the ravaged. How we choose to compensate those who are in direct conflict with the changes brought by competitive forces and how we reengage them in the marketplace is a great and thorny challenge for economic policymakers.

Economists today accept almost without debate that specialization and trade define the benefits of a market economy. Still, more than two centuries after Smith described the process, it remains one of the most mistrusted—if not vilified—economic notions among noneconomists. Consider the recent controversy when N. Gregory Mankiw, chairman of the president's Council of Economic Advisers, repeated this widely held view among economists: "Outsourcing of professional services is a prominent example of a new type of trade....When a good or service is produced at lower cost in another country, it makes sense to import it rather than to produce it domestically. This allows the United States to devote its resources to more productive purposes."

The mathematician Stanislaw Ulam once challenged Nobel laureate Paul Samuelson to name "one proposition in all of the social sciences that is both true and non-trivial." Several years later, Samuelson thought of the correct response: *comparative advantage.* "That it is logically true need not be argued before a mathematician; that it is not trivial is attested by the thousands of important and intelligent men who have never been able to grasp the doctrine for themselves or to believe it after it was explained to them."[2]

The Arithmetic of the Dismal Scientists: Early Growth Theory

Adam Smith gave us a crucial analytical framework, a model of the marketplace based on individual self-interest which, intentionally or not, promoted economic prosperity. The lever of riches was not, as the mercantilists had claimed, to be found in the accumulation of money, but in our ability to lower the costs of production and create new trade relationships. But Smith's was the era of the first great industrial revolution. Jethro Tull had invented his planting drill, Samuel Crompton his spinning "mule," and James Watt the steam engine, while in America, Eli Whitney would soon develop the cotton gin. New gadgetry was rearranging the nature of work, altering trade patterns, and ushering in an era of prosperity that had been unimaginable.

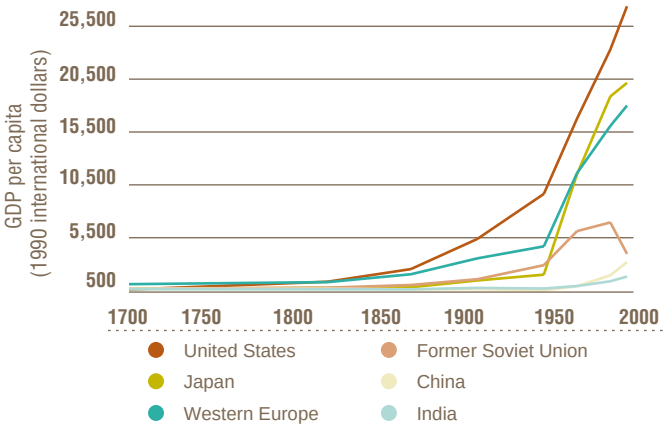
But if Adam Smith's vision for the world was hopeful, it would soon be dashed by the first generation of economists to follow him, notably the Reverend Thomas Robert Malthus. These early-nineteenth-century economists investigated the dynamics of Smith's model and found in it one inescapable conclusion: While prosperity may originate in specialization and trade, it would eventually be brought to a crashing end by unchecked

2 Samuelson (1969).

population growth. The undoing of prosperity is found in Malthus's "law" of diminishing returns, which he applied to land, but it could just as easily be applied to any economic resource. As more land is cultivated, Malthus argued, the productive capacity of each additional plot is necessarily less than the previous plot and, eventually, the expanding number of ravenous mouths will overtake food production. In this view, widespread poverty, misery, and suffering are inescapable.

Indeed, too much of the world continues to languish at or near the level of starvation the classical economists predicted would be the inevitable long-run state of the human race. But in the nineteenth century, a small number of nations were dramatically distancing themselves from that dismal fate in what economists now call the "great divergence." Something was propelling these nations, including the United States, forward at an undreamed-of pace.

Figure 1: The Great Divergence



In the nineteenth century, the United States joined Western Europe in distancing itself economically from the rest of the world. This prosperity gap accelerated during the Industrial Revolution, and today, these advanced economies enjoy per capita incomes six to 10 times that of other nations.

Source: Maddison (2001).

Charles Darwin, Cleveland Public Library/Photograph Collection;
Thomas Robert Malthus, Private Collection/Roger-Viollet, Paris/Bridgeman Art Library

Innovation, Extinction, and Growth: Evolution Meets the Dismal Science

Charles Darwin's inspiration for his theory of evolution may have come from the social sciences rather than biology. In 1838, four years after Thomas Malthus's death, Darwin, pursuing a "systematic inquiry" into the factors driving the origin of new species, read the works of Malthus, noting:

> *…the Struggle for Existence amongst all organic beings throughout the world, which inevitably follows from the high geometrical ratio of their increase, will be considered. This is the doctrine of Malthus, applied to the whole animal and vegetable kingdoms. As many more individuals of each species are born than can possibly survive; and as, consequently, there is a frequently recurring struggle for existence, it follows that any being, if it vary however slightly in any manner profitable to itself, under the complex and sometimes varying conditions of life, will have a better chance of surviving, and thus be "naturally selected." From the strong principle of inheritance, any selected variety will tend to propagate its new and modified form.*
>
> *—Origin of the Species*

The idea is that systems evolve as a result of innovation—which, if it is advantageous, supplants the obsolescent technology. The competition for limited resources favors the better technology and, as it flourishes, the economic "species" improves.

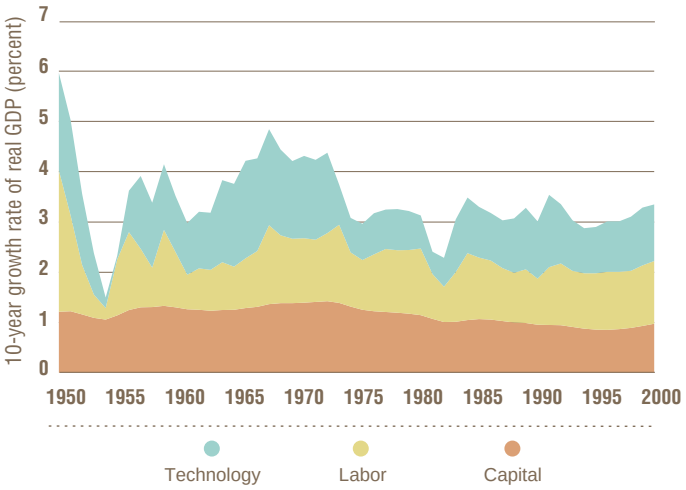
The Process of Growth: Innovation and Creative Destruction

During the first half of the twentieth century, the question of how economies grow over time, known as *growth theory*, was pushed to the back burner of economic inquiry, subjugated by the exigencies of the world's economic depression. *Stabilization theory* became the rallying cry of most economists, and it was exemplified by British economist John Maynard Keynes's scornful denigration of the long-run perspective of growth theorists when he said that "in the long run, we are all dead." To Keynes, the important questions did not concern the long march of economic progress, but the unnerving fluctuations that characterize that march—fluctuations he believed demonstrate the inherent instability of market economies and threaten to mire our economies in chronic underemployment, if not bring them down altogether.

While Keynes was refocusing economists' attention away from growth theory and toward stabilization theory, the Austrian-born Harvard economist Joseph Schumpeter argued that the two theories are inextricably connected. In Schumpeter's view, the ebb and flow of economic activity and national joblessness that Keynes had aimed to control are an integral—indeed, necessary—part of growth. Growth, he argued, is about *innovation*, or "putting productive resources to uses hitherto untried in practice, and withdrawing them from the uses they have served so far."[3] Schumpeter included in his set of growth-driving innovations the introduction of new products, new methods of production, new trade relationships, the discovery of raw materials, and the reorganization of business and economy activity. Each innovation, he believed, would be accompanied by temporary periods of joblessness and business stress as it "reconstruct[s] each time the economic system on a more efficient plan."[4] He called this process *creative destruction*.

Growth theory made another great leap forward in the 1950s with the publication of two influential papers by economist Robert Solow, who would go on to win a Nobel Prize. In his 1956 paper, Solow demonstrated that an economy's long-run growth is unaffected by its rate of saving and investment. The idea was similar to that posited by the classical economists and came to be known as the "neoclassical growth model." In a 1957 paper, Solow went on to show that nearly 90 percent of the rise in U.S. prosperity during the first half of the twentieth century came from technological growth, and not, as most economists had assumed, from the mere accumulation of machinery.[5]

Figure 2: Accounting for Growth



In the typical growth accounting exercise, economic growth is separated into three sources: labor, capital, and a hard-to-measure factor that connects workers to their machinery—technology. By this measure, technology has accounted for one-third of U.S. growth over the past 10 years.

Sources: Federal Reserve Bank of Cleveland; for standard parameter assumptions, see Edward C. Prescott, "Theory Ahead of Business Cycle Measurement," Federal Reserve Bank of Minneapolis, *Quarterly Review*, Fall 1986, 9-22.

Using Solow's framework and the accumulated evidence of several centuries, growth theorists now suspect that technological development is not the result of random inspiration, but instead arises from the same competitive, seemingly destructive, forces that produce all goods. The roots of this idea can also be traced back to Schumpeter:

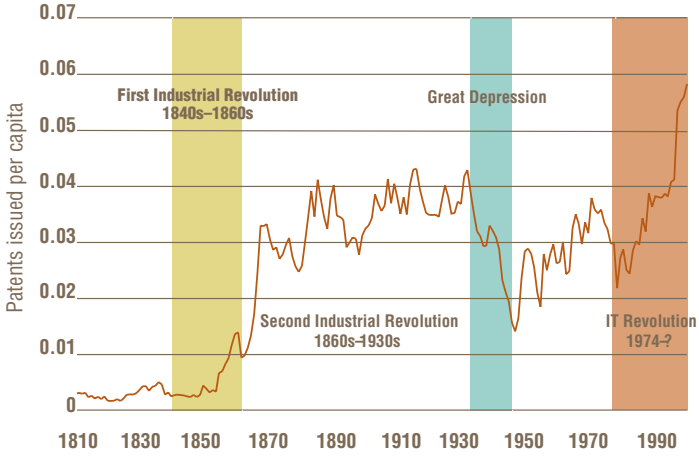
3 Schumpeter (1928).
4 Schumpeter (1934).

5 Subsequent "growth accounting" exercises, like the influential work of Edward F. Denison (1974) in the 1960s through the 1980s, have lowered that estimate, but the fact remains that technology—the introduction of innovations—is an essential component of long-run growth.

It is quite wrong…to say, as so many economists do, that capitalist enterprise was one, and technological progress a second, distinct factor in the observed development of output; they were essentially one and the same thing or, as we may also put it, the former was the propelling force of the latter.[6]

The theory that technology responds to market incentives—that an economy manufactures technology as it does other goods—is called *endogenous growth*. Innovation begets growth, which begets yet more innovation. But what is the nature of the process that spawns innovation, and is there anything that economic policymakers can do to promote it? These questions are being addressed by today's growth theorists in the hope that we might yet understand the lever of riches.[7]

Figure 3: Patents and Technological Revolution



Charles H. Duell, commissioner of the U.S. Patent Office in 1899, is often credited with the statement that "Everything that can be invented has been invented." Although it seems doubtful the commissioner actually made this remark, it is easy to underestimate the pace of innovation. Since the early 1970s, the number of patents per capita has accelerated to a new record, roughly doubling the pace of the 1960s and 1970s.

Sources: U.S. Department of Commerce, Patent and Trademark Office; and Greenwood (1999).

Innovation, Diffusion, and Economic Stress

History has revealed that major economic innovations take many years to fully diffuse throughout an economy, and the course is hardly steady. At first, new technology is slow to take hold. Businesses are heavily invested in the older technology, and the applications of the new technology—seen through the eyes of entrepreneurs, who tend to view production through the lens of the old technology—appear limited. Moreover, the new technology may require a critical level of diffusion before it is truly effective; for instance, a telephone isn't a particularly useful tool until a sufficiently large number of people own phones. And of course, the initial innovation is just the beginning, as supporting technologies are developed and diffused. Technological revolution "constitute[s] a social process that involves more than the sum of our individual struggles with inanimate nature. People are adjusting not only to changes in technology, but to changes that others are making to technology."[8]

The process of growth through innovation, erratic and uneven, produces some unpleasant side effects. At the inception of the new technology, productivity gains are difficult to come by, and productivity may actually decline for some time because of the awkward process of learning and assimilation. Here again we find the insights of Schumpeter: Some of the economy's existing capital will be made obsolete nearly overnight, and skills that once were valuable will no longer be needed. From livery workers to milkmen, elevator operators to wireless operators, railroad conductors to cobblers, gas station attendants to blacksmiths, our economic history is littered with jobs that are now largely obsolete. Workers will need to be retrained and production processes overhauled, and, for a time, unemployment will rise.

The process of creative destruction is also likely to create a temporary gap in the distribution of prosperity.[9]

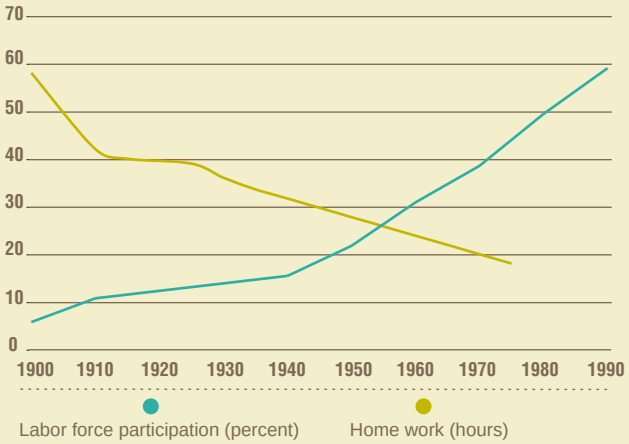
6 Schumpeter (1942).
7 Notably, economist Paul Romer (1990, 1994, 1996) of Stanford University.
8 Howitt (1994).
9 See Galor and Tsiddon (1997) and Greenwood (1999).

Innovation and Social Organization: Has Technology Liberated Women?

In 1900, about 5 percent of married women worked outside the home. By 1960, that figure had risen to about 30 percent, and in 1990, nearly 60 percent of all married women participated in the labor market. What accounts for this major social change? It seems to be the result of a confluence of events: the breakdown of social stereotypes, social legislation, the narrowing wage gap between the sexes, and—perhaps most underappreciated—women's liberation from home work as a result of innovation in home technology. This is one example of the social reorganization that often accompanies major technological breakthroughs.

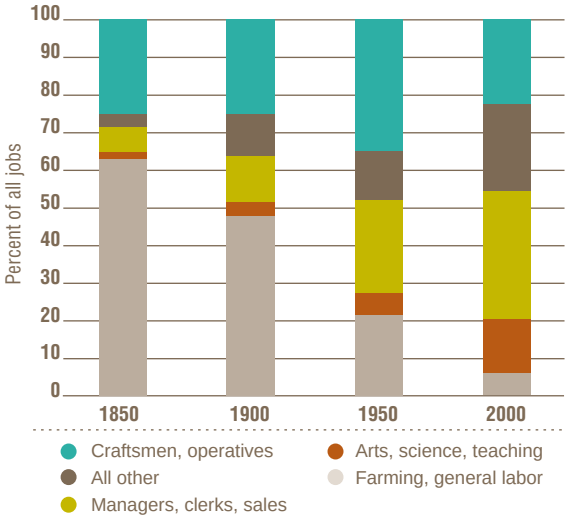
Economists Jeremy Greenwood, Ananth Seshadri, and Mehmet Yorukoglu (2003) argue that a variety of labor-saving devices—from home electronics in the 1920s and 1930s to the introduction of microwave ovens more recently—have dramatically lowered the time required for household chores, allowing women greater freedom to choose paid employment.

Home and Market Work of Married Women



Sources: Labor force participation rates are from Matthew Sobek, "A Century of Work: Gender, Labor Force Participation, and Occupational Attainment in the United States, 1880–1990," PhD diss., University of Minnesota, 1997; hours of home work is from Stanley Lebergott, *Pursuing Happiness, American Consumers in the Twentieth Century* (Princeton, NJ: Princeton University Press, 1993), table 8.1.

Figure 4: The Changing Character of American Jobs



The nature of American work has undergone dramatic change over time. While some jobs have remained relatively constant, many have fallen into economic obscurity, such as railroad conductors, porters, ushers, charwomen, elevator operators, postmasters, and midwives. In the last 50 years, the share of craftsmen and operatives has declined, replaced by occupations in the arts and sciences (including teachers), and managers, clerks, and salespeople.

Source: Steven Ruggles and Matthew Sobek, et al., *Integrated Public Use Microdata Series: Version 3.0* (Minneapolis, MN: Historical Census Projects, University of Minnesota, 2003).

Some will be so heavily invested in the old technology that the new process will seem like more of a threat than a benefit. The same will be true for the workforce. Collectively, then, there will be many people who have little interest in or ability to embrace the new tools and techniques. But over time, those who readily adapt to successful innovations will find their incomes growing faster than those who cling to obsolete technologies and business practices. Eventually, the superiority of the new technology will become so great that its widespread adoption is imperative. The next generation masters the skills associated with the newer methods, and income inequality falls as the technology is diffused across industries and occupations.

The economy is now being transformed by another great innovation, the microprocessor. This, and the vast number of innovations the microprocessor has spawned—called the *information technology revolution*—is dramatically lowering the cost of information. The cost

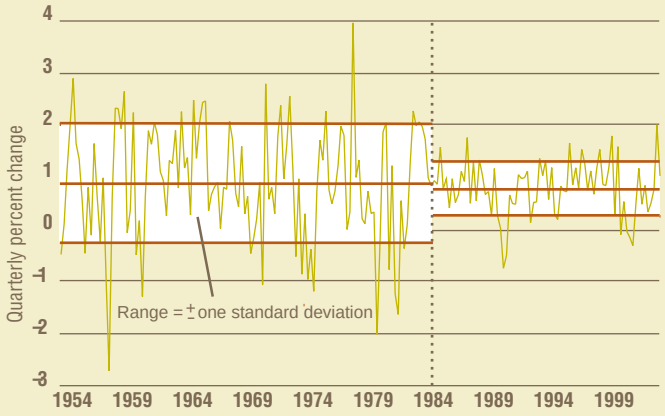
Smarter, Luckier, or Better Technology? What Accounts for the Improvement in U.S. Economic Stability?

One of the most remarkable developments of the last quarter-century has been the U.S. economy's increased stability: The variability of U.S. output has been cut in half during the last 20 years or so.

The puzzle of our recent economic stability has prompted three explanations—improved management of the economy by policymakers, good luck, and structural changes, including improved technology. All three probably deserve some measure of the credit, and each has its proponents.[10]

Economists Margaret McConnell and Gabriel Perez-Quiros (2000) say that, beginning in 1984, increased economic stability was associated with lower volatility in the durable goods sector of the economy, which, in turn, roughly coincided with a reduction in durable goods inventories. One reason for the improvement in inventory management may have been the widespread adoption of new technologies that have allowed firms to better manage their stock of goods relative to their sales.

U.S. Economic Stability since 1984



Source: U.S. Department of Commerce, Bureau of Economic Analysis.

per computation has declined so rapidly over the past few decades that mechanical devices have replaced human action in innumerable daily tasks.

Technology may be the reason for the surging U.S. productivity of the 1990s, and it may sustain us for quite some time. We may yet see a second wave of high productivity growth, brought about by still more innovation in IT software and services, greater diffusion of information technology in lagging sectors of the economy, and further cost advantages from the global production of technologies.[11] Sharply lower communications costs have accelerated the exchange of ideas in a way not seen since the invention of the telegraph. It is no exaggeration to say that information technology has expanded the marketplace to every location on the globe. Markets that had been isolated since before World War II are now opening, and we stand before a great opportunity that would have seemed impossible only a decade ago.

How this transformation will unfold is unknown, but we have learned from earlier periods in world history that, although the potential gains to our economic well-being are considerable, they are likely to be uneven. Several studies contend that technology has produced greater inequality in earnings in the United States, as the demand for workers who can adopt the technology rises relative to those who are less able to do so.[12] In some places, the transformation will put great stress on the existing economic order. The more dramatically the new technology promises to raise our *future* standard of living, the more disrupting it will be to *current* businesses and employees.

From the scribe guilds of the fifteenth century that resisted the introduction of Gutenberg's printing press, to the attempts by canal operators to block the expansion of the railroads, in every century, in every nation, in every industry, those who have a stake in the old ways

10 See Bernanke (2004).

11 Mann (2003) is one who predicts a second wave of IT-induced productivity growth. Oliner and Sichel (2000) document IT-related productivity growth during the 1990s. Baily (2001) provides a comprehensive overview of the issue.

12 See, for example, Autor, Katz, and Krueger (1998).

impede the new, either by direct assault, or indirectly in the name of preserving a particular way of life.[13]

Many social systems are resistant to change, making them infertile ground for breeding and adopting new ideas. Certainly, some thoughtful resistance to innovation makes sense. Like Darwin's genetic mutations, not every innovation is necessarily life enhancing, and it should prove itself in the competitive struggle with the existing regime. But "[u]nlike natural selection, however, in cultural evolution there is a feedback effect; a high level of resistance will not only obstruct the adoption of new ideas but also discourage their emergence altogether, thus throttling the supply of the raw material of which change is made."[14]

The usual justifications for resisting new technologies are diverse and predictable. New practices are frequently characterized as too risky, a corruption of social values or environmental harmony, destructive to human creativity, indeed, a threat to humanity itself. Historically, the political order controls the speed and direction of change by using controls on wages and prices, trade restrictions and protectionist measures, regulatory constraints on business expansions and contractions, and other strategies to preserve the status quo.

But the colossal failure of state-managed economic systems in the second half of the twentieth century is not just a warning about the dangers of replacing the values of the marketplace with the values of the state. It is also a warning about the fate of societies that cannot adjust to the shifting preferences and technologies that guide precious resources to their most beneficial use. For this reason, state-directed industrial policies, no matter how well intended or initially successful, tend to have a detrimental effect on growth. Once in place, they are hard to remove, and this creates inflexibility in the distribution of resources. We handcuff our futures to an economic structure that must, in time, become obsolete.

Luddite Rioters, Private Collection/Bridgeman Art Library

Resistance to Technology: The Luddites

New technology cannot help but make older technology obsolete—and the old technology will undoubtedly have a constituency with a vested interest in preserving it. In the first century, the emperor Tiberius, who had an interest in Roman glass manufacturing, is said to have ordered the inventor of "unbreakable" glass to be strangled. Fourteenth-century tailors in Cologne were prohibited from using machines that pressed pin heads. And the ribbon loom, originally invented in Germany in the late sixteenth century, was killed by political pressure—only to be reinvented 25 years later in the Netherlands.[15]

The Luddite movement was a notorious uprising that protested technological change. The Luddites began in 1811 as a band of artisans in the wool and cotton industries in Nottingham, England. Distraught over wage reductions, the use of unapprenticed workmen, and the emerging use of machines, the artisans vandalized mills across the English countryside. Operating under its mythical leader and namesake, Ned Ludd, the group sought to defend its livelihood by targeting the symbols of industrial change—the machinery and factories of England's early industrialists.

The Luddites gained widespread support throughout Nottingham and other shires. Their brutal and violent response to the new industrialists was met with the same, as the British government set troops against the rioters. Although the Luddites were ultimately overcome, antitechnology sentiment grew stronger in Victorian Britain, and the torch of technological leadership was passed to the American continent, where there was considerably less resistance to new technology.

13 For a detailed historical account of resistance to innovation, see Mokyr (1992). Parente and Prescott (1994) provide a theoretical treatment of barriers to technology adoption.
14 Mokyr (1992).
15 Examples are from Mokyr (1990, 1992).

"It is not the strongest of the species that survive, nor the most intelligent, but the one most responsive to change."

Charles Darwin

The Wealth of Nations: What Accounts for the Success of the American Economy?

Classical economists believed the unusually strong growth experienced in America during the early nineteenth century was a function of our great expanse of land relative to our small population. In time, as the population expanded and the law of diminishing returns took hold, it seemed likely that America's growth rate would fall back to match that of the European continent. But it did not. So if we are to believe modern growth theorists—that innovation is the origin of long-term growth—why has the United States been a more fertile environment for innovation than elsewhere? Some have suggested that much of America's economic success lies in what it did *not* do. During the industrial revolution of the late nineteenth and early twentieth centuries, America resisted many of the antitechnology forces that prevented other nations from realizing the full advantage of new technology.[16]

And so the nation was transformed from a rural giant to an industrial giant, but to say it was a difficult transition would be a gross understatement. Factories absorbed a rapidly increasing share of our nation's resources, and rural workers migrated to the industrializing urban centers in huge numbers.

It was an era of great upheaval that changed many of our social institutions, including our system of public education. Industrial capitalism placed a premium on workers who could read, compute, and interact with complex production processes, putting pressure on our educational institutions to turn out employees who could contribute more than brute force to the new economic order. Mass education became imperative, and the nation responded.

The same constellation of factors may be propelling the nation today as we rapidly assimilate information technologies into the economy. The successful adoption of new technology in America is often attributed to the nation's relatively unencumbered regulatory environment, more flexible labor markets, and, again, our educational system. In the United States, our emphasis on post–high school education has been general, not vocational, allowing greater flexibility for workers who face a changing work environment. We teach *how* to learn rather than *what* to learn. One estimate suggests the difference in education strategy between the United States and Europe may account for as much as three-quarters of the growth differential between the two over the past decade, with the remainder attributable to regulatory and labor "rigidities."[17]

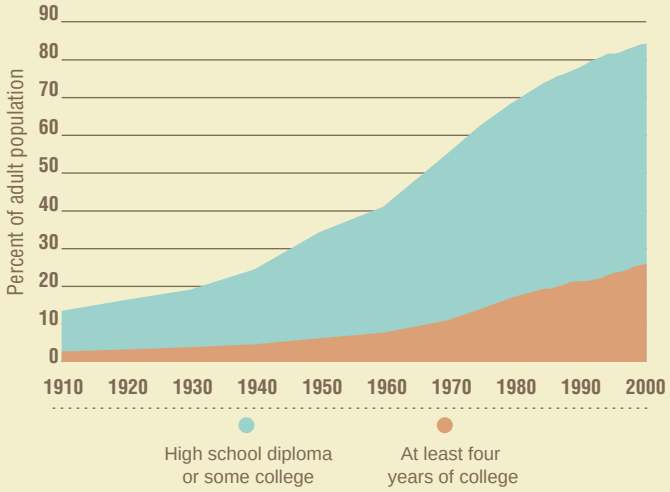
16 Mokyr (1992).

17 See Krueger and Kumar (2003). The role of general versus technical education is discussed in Bertocchi and Spagat (2001).

The Founding Fathers on Manufacturing and Public Education

To America's founding fathers, the public promotion of education was a matter of good government. For a democracy to be successful, its citizenry needed to be intellectually up to the challenge—and it would be from these enlightened citizens that our elected leaders would be drawn. Yet it may have been economic necessity that ultimately provided the motivation for our public education system. The study of practical subjects prepared the ground for the emergence of manufacturing, and it was an important—and perhaps underappreciated—force in our nation's industrialization. By the mid-nineteenth century, the United States had the highest rate of school enrollment of any nation, and its curriculum and egalitarianism became a model that other nations would follow.

U.S. Educational Achievement since 1910

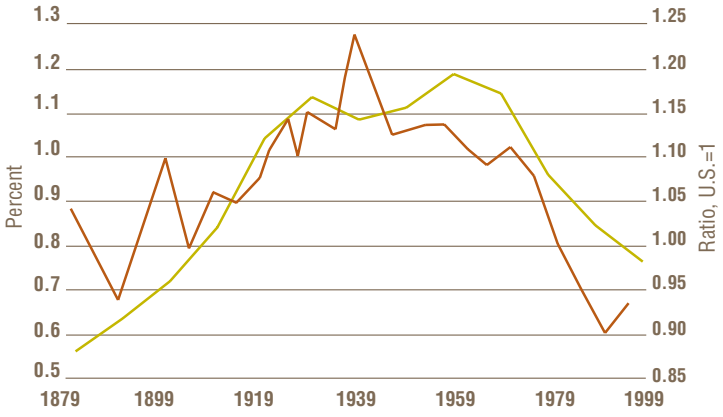


Source: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics,* 2002.

The Rise and Fall and Rise of Regional Economies

Can modern growth theory help us to understand our own region? Of course. Our natural infrastructure includes easy access to the lakes, rivers, and canals that moved products east, and, for a time, the greatest network of rail lines connecting resources to the rest of the nation. Our geography, combined with a frontier spirit, worked to the region's advantage at a time when new technologies enabled industrial mass production and transportation. Although these advantages initially started the ball rolling, they have not proved to be a continual source of economic prosperity. While our region's relative share of the national population peaked in the early 1960s, its relative productivity growth peaked some 30 years earlier, and the seeds of that gradual decline may have been sowed in the 1920s, when our region's network of innovators became "industrycentric," focusing on technologies that served a particular industrial need rather than general technology that would spawn new businesses.[18]

Figure 5: Population and Productivity in Northeast Ohio



Northeast Ohio, traditionally known for durable goods manufacturing, peaked as a share of the national population in the early 1960s. But the seeds of that decline may have begun considerably earlier: According to one estimate, the region's relative productivity may have peaked just before World War II.

a. Value added per production worker, relative to U.S. average.
Source: Fogarty, Garofalo, and Hammack (2002).

18 See Forgarty, Garofalo, and Hammack (2002).

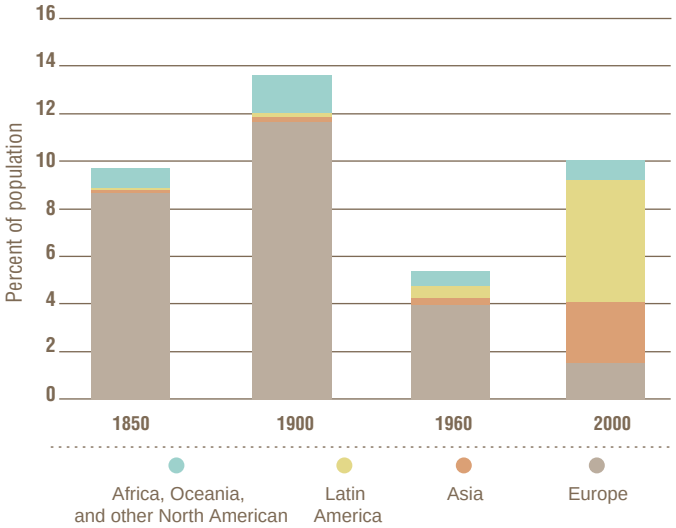
The key to maintaining a region's economic vibrancy, like that of a nation, is to be found in its ability to sustain a community of innovators. Although there is no foolproof cookbook to follow, modern growth theory nevertheless suggests some appealing recipes. Some of the qualities that may help an economy to nurture innovation are a commitment to the rule of law, stable government and economic institutions, openness to trade, and a willingness to integrate our economy with an expanding international marketplace. To these we add the following ingredients.

Diversity

We must think about the elements that make the ground fertile for new ideas—or perhaps more accurately, for new *idea makers*. Many economists believe communities of innovators are attracted as much as they are bred. The process goes something like this: A major technological breakthrough creates a wage premium for high-ability individuals—those with the capacity to apply the technology most effectively. These workers migrate to sectors of the economy that offer the greatest potential for advancing the technology, and the growing concentration of workers creates an environment of continuous innovation—that is, the intellectual synergy necessary for even more growth-sustaining innovation.[19] The American melting pot, our great social and ethnic diversity, is not only about adding more mouths to a fixed stock of resources, as it has been portrayed since Thomas Malthus, but may itself contribute to our fertile ground for innovation. With such diversity in people and cultures, we cannot help but see old problems in new ways.

In a similar spirit, Richard Florida (2002) of Carnegie Mellon University suggests that communities need to create an environment that is attractive to what he calls the "creative class," which may include scientists and artists, lawyers and musicians, teachers and poets—any group of people whose product is ideas. Certainly, lifestyle amenities are important to attracting a community of innovators. But perhaps even more important is a community's openness to new ideas and different perspectives. Whereas in the current language of regional economic development, the term "brain drain" refers to the migration of younger, highly educated residents to other communities, "innovation drain" characterizes the loss of creative people whose ideas are the engine of economic growth.

Figure 6: Immigrants in America



America has seen a resurgence of immigrants in the workforce, especially during the 1990s, when foreign-born workers made up nearly half of the net increase in the U.S. labor force. In 2000, just over 10 percent of the U.S. population was foreign born, almost twice its 1960 level. Moreover, the geographic origins of immigrants have shifted considerably, with Asian and Latin America immigrants replacing people of European origin as the predominant share of our foreign-born population.

Source: Mosisa (2002).

Ending the Manufacturing versus Services Debate

What Adam Smith tried to teach us in *The Wealth of Nations* is that economic strength does not lie in *what* a nation produces, but *how effectively* it's produced. Our present attachment to the industrial economy, from which many presume our national wealth flows, closely parallels our attachment to farming during the first half

19 These "agglomeration effects" can be traced to the work of Cambridge economist Alfred Marshall (1920).

of the last century. In that world, as we may have forgotten, most presumed wealth came from the ground. Manufacturers, the proponents of agriculture claimed, were merely the benefactors of agricultural wealth, not the creators of it. Without farming and mining and forestry, there would be nothing to manufacture! This idea was powerfully expressed during the last industrial revolution by the great Populist orator, William Jennings Bryan. Speaking at the Democratic Convention of 1896, Bryan thundered:

> *[T]he great cities rest upon our broad and fertile prairies. Burn down your cities and leave our farms, and your cities will spring up again as if by magic; but destroy our farms and the grass will grow in the streets of every city in the country.*

This idea is simple and intuitive—and we now know it is wrong. Seventy years ago, 26 percent of our nation worked on farms—about 10 percentage points higher than the number currently working in U.S. manufacturing. Within 30 years, that share had fallen to just below 7 percent of all jobs, and 30 years after that, agricultural workers represented only about $2\,^1/_2$ percent of all jobs. Indeed, the rise of U.S. manufacturing was driven, in part, by the continual, unrelenting pressure of the marketplace to make our food better and cheaper.

Today, we hear the same story turned on its head: Manufacturing, some say, is the origin of wealth. The service economy, for all its fanfare, is little more than one hand scratching the other, and wouldn't be possible without the wealth generated by industry. Of course, the importance of manufacturing employment is waning—that has been a persistent and defining characteristic of the manufacturing economy since 1960. But manufacturing and service output have been expanding, with each sector depending on the other in ways that are changing over time. It is not one *versus* the other, but one *and* the other that leads to greater prosperity.

Education, Government, and Institutions

Are there any policies that can help to facilitate innovation? At the top of virtually every economist's list is education. During the last century—what Claudia Goldin (2002) calls the "human capital century"—the United States led the world in raising the educational level of its citizens. The virtues of the U.S. mass educational system, that "it was publicly funded, managed by numerous small, fiscally independent districts, open and forgiving, academic yet practical in its curriculum, secular in control, and gender-neutral in its admission… increased social mobility and enhanced economic growth."[20] The success of a country's educational system is still a critical determinant of how quickly and effectively workers can assimilate new, growth-enhancing technologies.[21]

But education by itself may not be enough if a nation inhibits its citizens' incentives to gain from their educational capital. In 1999, economists Robert Hall and Charles Jones investigated why some nations create prosperity so much more successfully than others. The authors concluded that it is a consequence of "social infrastructure," the incentives that a nation's institutions and government policies provide, which take the form of the protection of property rights, the embrace of trade, and capital and labor flexibility.

In other words, having a comparative advantage in ideas requires a highly educated workforce—but knowing this is not a sufficient condition for achieving it. Policymakers must carefully evaluate the *public* returns to a variety of competing investments that may include roads, sports complexes, industrial site development, business location incentives, and education. Sound public policy justifies reallocating funds to high-return activities, as well as experimenting with different ways of delivering services if traditional organizational structures do not

20 Goldin (2002).
21 Benhabib and Spiegel (1994) model and estimate these effects across countries.

yield the desired outcomes. States spend resources to attract businesses from "them" to "us," an activity that, overall, does little good for society. What if more of these resources were devoted to building human capital?

Nobel laureate James Heckman (2003) argues that education generally delivers the greatest returns to public investment, and that social returns to early childhood development yield the highest returns of all. But money alone is not always the answer: Public funds for K–12 education have increased considerably during the past several decades, but educational outcomes have hardly changed.[22] Innovation and the willingness to try new methods might yield better results.

The Long Run May Be Closer than We Think

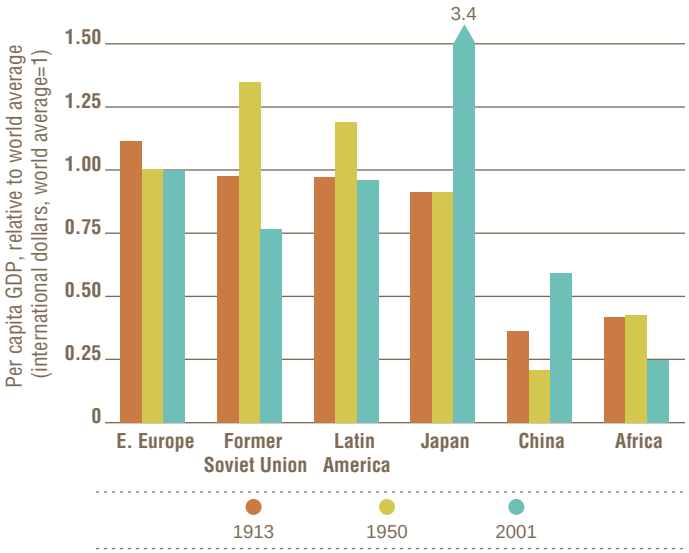
Productivity in the United States has increased generation after generation, creating ever-rising standards of living. Our knowledge-based skills in a business environment…have enabled our workforce to create ever-greater value added—irrespective of what goods and services we have chosen to produce at home and what and how much we have chosen to import.
—Alan Greenspan, Federal Reserve Chairman, 2004

At the turn of the nineteenth century, the United States was one of a select group of nations that were able to distance themselves from the subsistence threshold that characterized many of the world's economies. Membership in that elite group has not been exclusive, as some nations that were slow to prosper are now finally doing so. And of course, membership among the world's most economically elite nations is not necessarily permanent—some nations that were once prosperous are no longer so.[23]

One of the most important policy implications of the new theory of endogenous growth is that we must think more holistically about our economic environment. That is, we must think not in terms of specific industries or projects, but in terms of whether the economic climate is conducive to innovation and change. To do so requires that we lengthen the horizon over which we hope to effect change. Nations, regions, and cities can live for quite some time off their past successes, addressing what they perceive to be their immediate needs. They can protect their established industries, they can discourage newcomers, and they can squabble over how to divide what assets they still have. In the meantime, innovation will migrate to a more accepting environment and take root—disruptions and all.

Change comes hard, and change takes time, but cumulative change raises living standards in the only way it can, step by step. It is easy for citizens to resist change, but harder for their children and grandchildren to live with the consequences. Policies put in place today, even if they raise living standards by only $^1/_2$ percentage point each year, will raise prosperity by 25 percent within 44 years, roughly the working life of the average person. Small gains can offer such great long-run rewards.

Figure 7: Relative Economic Prosperity



While some of the world's economies have advanced far beyond the average, membership in this group is not exclusive or permanent. Former Soviet countries and Latin America enjoyed a relatively high standard of living in the middle half of the last century, but have since seen that advantage decline. Japan, on the other hand, has greatly elevated itself relative to the average in the latter half of the century, while China has recently begun to improve its economic standing.

Source: Maddison (2003).

22 See Hanushek (2002).
23 See Dowrick and DeLong (2003).

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Operational Highlights

As the nation's central bank, the Federal Reserve's chief objectives are to promote sustained, long-term economic growth and to foster a sound and efficient financial system. This charge is particularly salient today, as our payments system undergoes significant change: Market demands and new technologies are spurring the rapid development of new electronic delivery channels. As a result, the Federal Reserve is making investments in research and technology to both modernize paper payments and ensure the stability and effectiveness of electronic payments.

The U.S. payments system has witnessed a surge of innovation in recent years—and a great deal of that innovation is occurring right here in the Fourth Federal Reserve District. The Federal Reserve Bank of Cleveland, which has long been known for its hard work, creativity, and ability to get the job done, is partnering with the U.S. Treasury, industry groups, and financial institutions on projects throughout the Federal Reserve System that are helping to improve the infrastructure of our payments system and bringing electronic payments to market.

Modernizing the Check Factory

Although paper checks may be on the decline, they're certainly not a thing of the past. Consumers continue to favor checks because they are convenient, familiar, universally accepted, and offer simple record keeping. According to the most recent Federal Reserve estimates, roughly 40 billion checks—60 percent of all noncash payments—are still written in the United States each year.

But the work of processing checks is costly and labor intensive. For that reason, the Federal Reserve has sought out ways to improve the efficiency of its check operations—to modernize its factory, so to speak. In 2003, the Federal Reserve completed its four-year Check Modernization initiative, which overhauled the systems and infrastructure for processing checks. The Cleveland Bank's Retail Payments Office, working in partnership with the Federal Reserve Bank of Atlanta, led the development and implementation of this ambitious project, which was completed on time and within budget.

Check Modernization has standardized check processing across Federal Reserve offices nationwide, implemented common software for processing and researching check adjustments, delivered Web-based services to financial institutions, and created a national archive and retrieval system for check images. The Cleveland Office is home to one of two national check image archive sites, where the Bank stores approximately 250 million images every month for financial institutions across the country.

In addition to the operational efficiencies and flexibility afforded by Check Modernization, the improvements will allow the Fed to develop and roll out new products more quickly and cost-effectively.

Responding to a Changing Market for Check Services

While the Check Modernization initiative has dramatically improved the Fed's infrastructure for check payment processing and the quality of service it provides to depository institutions, market forces cannot be ignored: The use of checks is declining, and that has had a significant impact on Federal Reserve operations. For this reason, the Federal Reserve System announced in early 2003 that it would reduce the number of check processing locations nationwide from 45 to 32. Additionally, the System will reduce the number of sites that perform check adjustments to 12 regional locations. The move will allow the Fed to continue providing high-quality check services while maintaining efficient, cost-effective operations.

What does this mean for the Fourth Federal Reserve District? In late 2003, the Cleveland Office took on the check processing volume of its Pittsburgh branch, which no longer performs check activities. Throughout 2004, the Bank's check operations in Cincinnati will absorb the work of three check offices in Indianapolis, Louisville, and Charleston, making it one of the largest check processing sites in the System. In addition, the Cleveland Office will take on check adjustments from five offices in our District and others.

As we make these changes, financial institutions can be assured that the Federal Reserve Bank of Cleveland will continue its tradition of high-quality check services and superior customer service.

Clearing the Way

The nation's check collection system is also getting a boost from a law enacted in late 2003, the Check Clearing for the 21st Century Act—"Check 21" for short. The legislation, which will become effective in October 2004, promises to foster innovation and efficiency in the payments system by reducing some of the impediments to check truncation.

Under the new law, financial institutions will be able to collect and return checks by using digital images and electronic check information to create substitute paper checks that will be the legal equivalent of the original check.

For banks, Check 21 will mean greater efficiency, lower check handling and transportation costs, and the ability to broaden deposit options for customers. Plus, financial institutions will be able to take full advantage of electronic check collection and return capabilities, giving customers an attractive alternative to the current paper-based system.

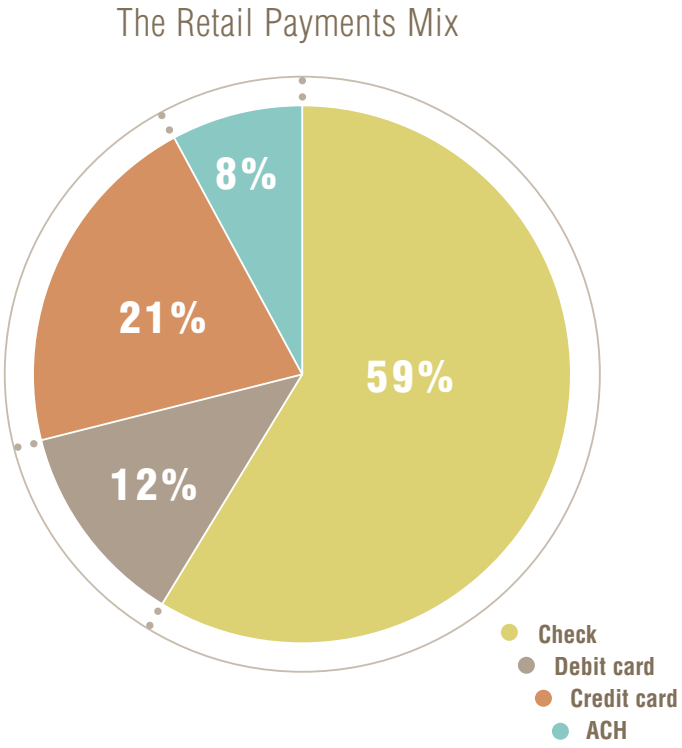
The Cleveland Fed, working on behalf of the System's Retail Payments Office, is once again taking a leadership role by preparing for the requirements of Check 21, designing a new suite of products and services, and overseeing the project's implementation.

Transforming Electronic Payments

Even as the Federal Reserve works to make traditional paper payments as efficient as possible, it's clear that electronic payments are driving today's financial services: Electronic payments have increased nearly fivefold over the past two decades. That's why we're putting as much brain power into the future of electronic payments as we are improving existing paper payments. The Fed—and the Cleveland Reserve Bank in particular—is at the center of several exciting initiatives that are paving the way for new payment vehicles.

More and more consumers are choosing to pay bills online because of the convenience, cost savings, and improved security of internet payments. It makes sense, then, for companies to take advantage of the same benefits by actually presenting bills electronically and eliminating the paper bills that consumers receive each month.

In 2003, the Cleveland Fed continued to champion the Electronic Billing Information Delivery System (EBIDS), which aims to deliver summary electronic bills to consumers through their financial institutions using the Fed's ACH network. The Cleveland Bank is taking a leadership role in moving the EBIDS concept into a national pilot program, working in partnership with NACHA (the rules-making body for ACH payments), industry groups, financial institutions, and private companies. EBIDS is expected to complement banks' existing online banking and ACH applications by delivering bill content and supporting the adoption of electronic payments.

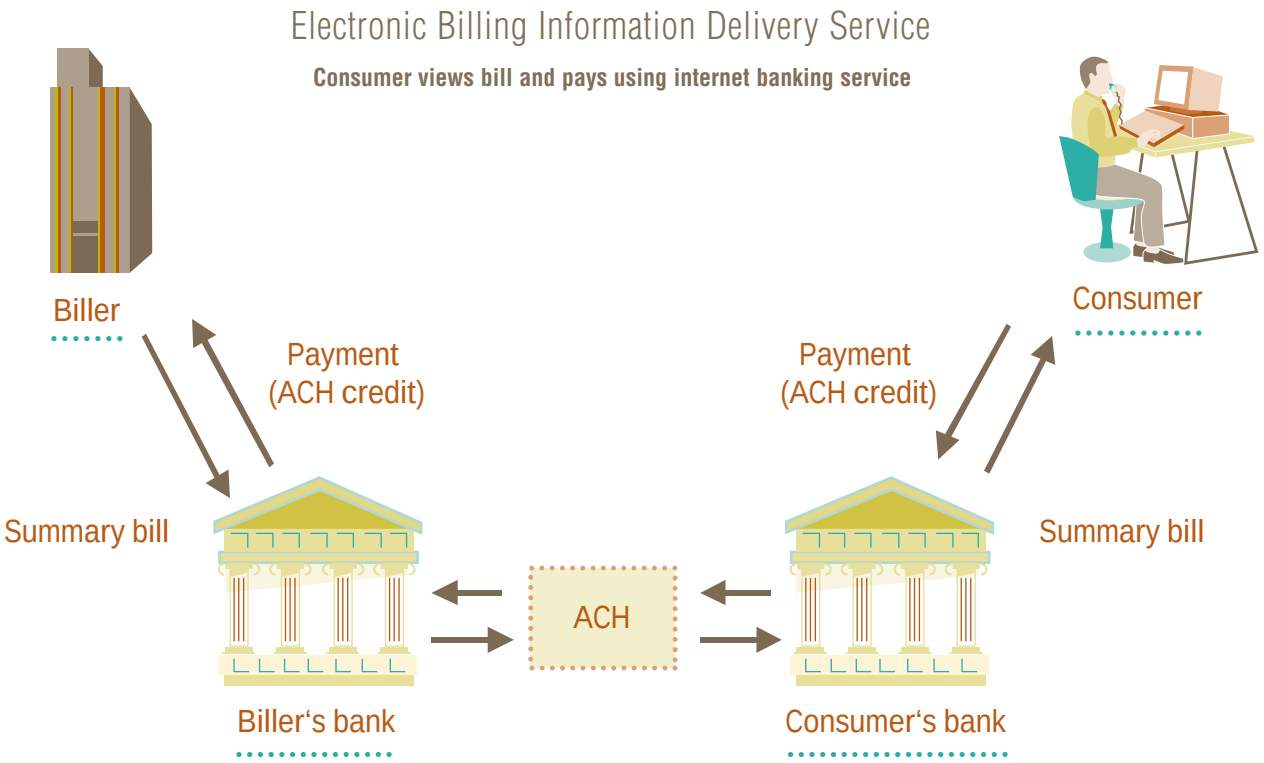


By eliminating the cost and hassle of paperwork, EBIDS promises to be a win–win solution for everyone involved. Consumers can receive and pay more of their bills at a single banking site, and they can easily control the timing and amount of payment. Financial institutions retain their primary role as payments providers, and gain added support for their existing internet banking business. Finally, billers benefit from the reduced costs of processing bills and remittances. Although the EBIDS pilot will focus on consumer bill presentment, industry groups expect the service to have significant business-to-business applications in the future.

Helping Government Work Better

One of the Fed's chief responsibilities is to act as the fiscal agent for the U.S. government. Like most organizations, the U.S. Treasury Department has set ambitious goals to reduce its costs and improve the efficiency of government financial operations. Two key parts of that goal are ensuring the efficient operation of the current savings bond and TreasuryDirect businesses, and the transition to an electronic environment for government transactions with the public.

The Federal Reserve Bank of Cleveland has long operated the largest, most efficient, and most innovative site for processing savings bonds on behalf of the Treasury's Bureau of Public Debt. In late 2003, the Treasury announced it would reduce the number of Federal Reserve sites providing Treasury retail securities services from nine to two. The Cleveland Fed's Pittsburgh Office was chosen to be one of only two Reserve Banks doing this work. The multiyear transition—which the Cleveland Bank is leading on the System's behalf—will require the Pittsburgh Office to reestablish its TreasuryDirect functions and expand its savings bond operation.



The Treasury's decision was based on its long-term goal to move to an electronic processing environment—with the new Web-based TreasuryDirect system at the center. This new system represents a different way of doing business for the Bureau of Public Debt: It allows investors to purchase savings bonds (and eventually marketable securities) online and hold them as book-entry securities. The system is expected to decrease the number of paper transactions processed and provide greater convenience and flexibility for investors.

When you think of your interactions with government agencies, "convenient" and "efficient" may not be the words that immediately come to mind. But thanks in part to the Government Paperwork Elimination Act—a federal law that requires agencies to accept forms electronically—that's beginning to change. That act is one component of a governmentwide move to "electronify" services.

For several years, the Federal Reserve Bank of Cleveland has worked closely with the Treasury's Financial Management Service, which is responsible for government payments and collections, to help reengineer the government's collections process. One result, Pay.gov, gives individuals and corporations a fast, safe, and convenient way to complete and submit forms to government agencies and make payments online. For example, the Federal Trade Commission uses Pay.gov to collect fees from telemarketers who purchase the national Do Not Call list, and the National Park Service uses the system to process camping permits and collect fees.

The Pay.gov project is a model for how the Fed works collaboratively to foster innovation and efficiency in the payments system: Over the course of several years, the Cleveland Bank has partnered with the Treasury, on whose behalf it works, and with more than a dozen federal agencies sponsored by the Financial Management Service. In 2003, use of Pay.gov continued to rise: By year-end, it supported 17 federal agencies and processed nearly half a million transactions (totaling $3.8 billion), an increase of nearly 200 percent over 2002.

In addition to its work on Pay.gov, the Cleveland Reserve Bank has partnered with the Treasury's Financial Management Service to develop and implement a second electronic payments initiative, Paper Check Conversion. The service, known as PCC, converts paper checks presented at the point of sale at government and military locations worldwide into electronic debits. It is an innovative, highly automated system that improves the collection, reconciliation, and reporting processes for federal agencies.

PCC is deployed at military bases overseas and at government agencies in the United States. In 2003, Federal Reserve staff responded to the Treasury's request for rapid deployment at several military bases in the Middle East during the months preceding the war in Iraq—an effort recognized by both the Assistant Secretary of the Army and the Assistant Secretary of the Treasury. By the end of 2003, Paper Check Conversion supported 40 agencies at 170 locations around the world, processing more than 740,000 transactions totaling $391 million.

Where To?

The pace of change and innovation in financial services isn't likely to slow down any time soon—and that's a good thing. The innovation that's taking place in our industry today means growth and prosperity tomorrow. By embracing change and remaining open to the possibilities that technology is bringing us, we all benefit. Although our environment may be uncertain, one thing is for sure: The Federal Reserve remains committed to ensuring the safety, soundness, and efficiency of the nation's payments system today and in the future.

The firm engaged by the Board of Governors for the audits of the individual and combined financial statements of the Reserve Banks for 2003 was PricewaterhouseCoopers LLP (PwC). Fees for these services totaled $1.4 million. To ensure auditor independence, the Board of Governors requires that PwC be independent in all matters relating to the audit. Specifically, PwC may not perform services for the Reserve Banks or others that would place it in a position of auditing its own work, making management decisions on behalf of the Reserve Banks, or in any other way impairing its audit independence. In 2003, the Bank did not engage PwC for advisory services.

Management's Report on Responsibility for Financial Reporting

March 8, 2004

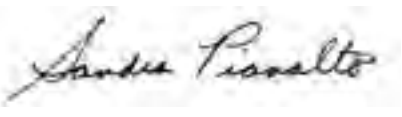
To the Board of Directors of the Federal Reserve Bank of Cleveland:

The management of the Federal Reserve Bank of Cleveland ("Bank") is responsible for the preparation and fair presentation of the Statement of Financial Condition, Statement of Income, and Statement of Changes in Capital as of December 31, 2003 ("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 ("Manual"), and as such, include amounts, some of which are based on judgments and estimates of management. To our knowledge, the Financial Statements are, in all material respects, fairly presented in conformity with the accounting principles, policies and practices documented in the Manual and include all disclosures necessary for such fair presentation.

The management of the Bank 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 Bank 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, we believe that the Bank maintained an effective process of internal controls over financial reporting including the safeguarding of assets as they relate to the Financial Statements.



President
and Chief Executive Officer
Federal Reserve Bank of Cleveland

First Vice President
and Chief Operating Officer
Federal Reserve Bank of Cleveland

Senior Vice President
and Chief Financial Officer
Federal Reserve Bank of Cleveland

Report of Independent Accountants on Financial Reporting

PricewaterhouseCoopers LLP

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

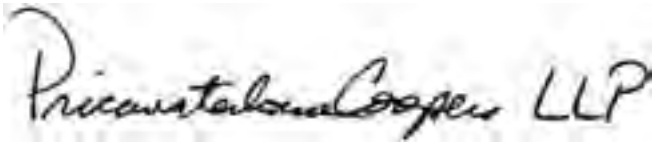
We have examined management's assertion, included in the accompanying Management Assertion, that the Federal Reserve Bank of Cleveland ("FRB Cleveland") maintained effective internal control over financial reporting and the safeguarding of assets as they relate to the financial statements as of December 31, 2003, based on criteria established in *Internal Control—Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission. FRB Cleveland's management is responsible for maintaining effective internal control over financial reporting and safeguarding of assets as they relate to the financial statements. Our responsibility is to express an opinion on management's assertion based on our examination.

Our examination was conducted in accordance with attestation standards established by the American Institute of Certified Public Accountants and, accordingly, included obtaining an understanding of internal control over financial reporting, testing and evaluating the design and operating effectiveness of internal control, and performing 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 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 FRB Cleveland maintained effective internal control over financial reporting and over the safeguarding of assets as they relate to the financial statements as of December 31, 2003 is fairly stated, in all material respects, based on criteria established in *Internal Control—Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

This report is intended solely for the information and use of management and the Board of Directors and Audit Committee of FRB Cleveland and any organization with legally defined oversight responsibilities and is not intended to be and should not be used by anyone other than these specified parties.



March 1, 2004

Report of Independent Accountants on Financial Statements

PricewaterhouseCoopers LLP

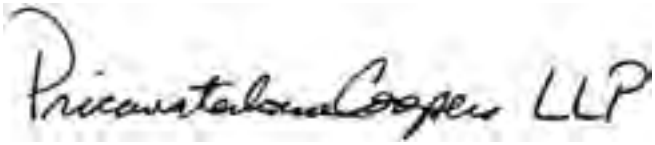
To the Board of Governors of the Federal Reserve System and
the Board of Directors of the Federal Reserve Bank of Cleveland:

We have audited the accompanying statements of condition of the Federal Reserve Bank of Cleveland (the "Bank") as of December 31, 2003 and 2002, and the related statements of income and changes in capital for the years then ended, which have been prepared in conformity with the accounting principles, policies, and practices established by the Board of Governors of the Federal Reserve System. These financial statements are the responsibility of the Bank's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with auditing standards generally accepted in the United States of America. 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 described in Note 3, these 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 of America.

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, 2003 and 2002, and results of its operations for the years then ended, on the basis of accounting described in Note 3.



March 1, 2004

Comparative Financial Statements

STATEMENTS OF CONDITION

(in millions)

	As of December 31, 2003	As of December 31, 2002
ASSETS		
Gold certificates	$ 477	$ 522
Special drawing rights certificates	104	104
Coin	33	43
Items in process of collection	595	764
U.S. government and federal agency securities, net	31,655	35,264
Investments denominated in foreign currencies	1,665	1,531
Accrued interest receivable	237	301
Bank premises and equipment, net	180	182
Other assets	69	64
Total assets	**$ 35,015**	**$ 38,775**
LIABILITIES AND CAPITAL		
Liabilities:		
Federal Reserve notes outstanding, net	$ 28,375	$ 28,170
Securities sold under agreements to repurchase	1,202	1,164
Deposits:		
Depository institutions	1,260	1,393
Other deposits	4	4
Deferred credit items	521	685
Interest on Federal Reserve notes due U.S. Treasury	24	71
Interdistrict settlement account	2,103	5,818
Accrued benefit costs	61	58
Other liabilities	11	8
Total liabilities	**$ 33,561**	**$ 37,371**
Capital:		
Capital paid-in	727	702
Surplus	727	702
Total capital	**1,454**	**1,404**
Total liabilities and capital	**$ 35,015**	**$ 38,775**

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

STATEMENTS OF INCOME (in millions)

	For the year ended December 31, 2003	For the year ended December 31, 2002
Interest income:		
Interest on U.S. government and federal agency securities	$ 1,097	$ 1,410
Interest on investments denominated in foreign currencies	22	24
Total interest income	**1,119**	**1,434**
Interest expense:		
Interest expense on securities sold under agreements to repurchase	11	1
Net interest income	**1,108**	**1,433**
Other operating income:		
Income from services	56	66
Reimbursable services to government agencies	32	26
Foreign currency gains, net	227	194
U.S. government securities gains, net	—	4
Other income	4	4
Total other operating income	**$ 319**	**$ 294**
Operating expenses:		
Salaries and other benefits	93	86
Occupancy expense	13	11
Equipment expense	13	13
Assessments by Board of Governors	52	40
Other expenses	49	46
Total operating expenses	**220**	**196**
Net income prior to distribution	**$ 1,207**	**$ 1,531**
Distribution of net income:		
Dividends paid to member banks	$ 42	$ 42
Transferred to surplus	25	37
Payments to U.S. Treasury as interest on Federal Reserve notes	1,140	1,452
Total distribution	**$ 1,207**	**$ 1,531**

STATEMENTS OF CHANGES IN CAPITAL (in millions)

For the years ended December 31, 2003 and December 31, 2002

	Capital Paid-in	Surplus	Total Capital
Balance at January 1, 2002 (13.3 million shares)	$ 665	$ 665	$ 1,330
Net income transferred to surplus	—	37	37
Net change in capital stock issued (0.7 million shares)	37	—	37
Balance at December 31, 2002 (14 million shares)	$ 702	$ 702	$ 1,404
Net income transferred to surplus	—	25	25
Net change in capital stock issued (0.5 million shares)	25	—	25
Balance at December 31, 2003 (14.5 million shares)	$ 727	$ 727	$ 1,454

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

Notes to Financial Statements

1. STRUCTURE

The Federal Reserve Bank of Cleveland ("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 twelve 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. The Bank and its branches in Cincinnati and Pittsburgh serve the Fourth Federal Reserve District, which includes Ohio and portions of Kentucky, Pennsylvania, and West Virginia. 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. 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

In accordance with the Federal Reserve Act, supervision and control of the Bank are exercised by a 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 ("ACH") operations and check processing; distributing coin and currency; performing 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.

In performing fiscal agency functions for the U.S. Treasury, the Bank provides U.S. securities direct purchase and savings bonds processing services. In December 2003, the U.S. Treasury selected the Bank as one of two future consolidation sites for these services. An implementation plan is expected to be announced in March 2004. At this time, the Bank has not developed a detailed estimate of the financial effect of the consolidation.

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, the purchase of securities under agreements to resell, the sale of securities under agreements to repurchase, and the lending of U.S. government securities. The FRBNY is also authorized by the FOMC to hold balances of, and to execute spot and forward foreign exchange ("F/X") and securities contracts in nine 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 accounting principles generally accepted in the United States of America ("GAAP"). 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 generally required by GAAP. In addition, the Bank has elected not to present a Statement of Cash Flows. The Statement of Cash Flows has not been included because the liquidity and cash position of the Bank are not of primary concern to the users of these financial statements. Other information regarding the Bank's activities is provided in, or may be derived from, the Statements of Condition, Income, and Changes in Capital. A Statement of Cash Flows, therefore, would not provide any additional useful information. There are no other significant differences between the policies outlined in the Financial Accounting Manual and GAAP.

Each Reserve Bank provides services on behalf of the System for which costs are not shared. Major services provided on behalf of the System by the Bank, for which the costs were not redistributed to the other Reserve Banks, include: Retail Payments Office, Check Standardization Project, National Check Restructure, FedImage, Cash Automation and Materials Handling Software, Savings Bonds, including software and architecture, National Billing Operations, National Information Center, Audit Application Competency Center, and Electronic Access Products, including Pay.Gov, Paper Check and Check to ACH conversions.

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, 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 on average Federal Reserve notes outstanding in each District.

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 United States 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 SDR certificates, at the direction of the U.S. Treasury, for the purpose of financing SDR acquisitions or for financing exchange stabilization operations. At the time SDR transactions occur, the Board of Governors allocates SDR certificate transactions among Reserve Banks based upon Federal Reserve notes outstanding in each District at the end of the preceding year. There were no SDR transactions in 2003 or 2002.

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. If loans were ever deemed to be uncollectible, an appropriate reserve would be established. Interest is accrued using the applicable discount rate established at least every fourteen days by the Boards of Directors of the Reserve Banks, subject to review by the Board of Governors. There were no outstanding loans to depository institutions at December 31, 2003 and 2002, respectively.

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. Such authorizations are reviewed and approved annually by the FOMC.

In December 2002, the FRBNY replaced matched sale-purchase ("MSP") transactions with securities sold under agreements to repurchase. MSP transactions, accounted for as separate sale and 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. Securities sold under agreements to repurchase are treated as secured borrowing transactions with the associated interest expense recognized over the life of the transaction.

The FRBNY has 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 on behalf of the System, 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 the FRBNY to take possession of collateral in excess of the market values of the securities loaned. The market values of the collateral and the securities loaned are monitored by the FRBNY on a daily basis, with additional collateral obtained as necessary. The securities loaned continue to be accounted for in the SOMA.

F/X 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 two authorized foreign central banks. The parties agree to exchange their currencies up to a pre-arranged maximum amount and for an agreed-upon period of time (up to twelve months), at an agreed-upon interest rate. These arrangements give the FOMC temporary access to foreign currencies 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 counter-party 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 may result in gains or losses when holdings are sold prior to maturity. Decisions regarding the securities and foreign currencies transactions, including their purchase and sale, are motivated by monetary policy objectives rather than profit. Accordingly, market values, 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 and federal agency securities" or "Interest on investments denominated in 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, net. Foreign-currency-denominated assets are revalued daily at current foreign currency 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, net. Foreign currencies held through F/X swaps, when initiated by the counter-party, and warehousing arrangements are revalued daily 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, securities sold under agreements to repurchase, securities loaned, investments denominated in foreign currency, interest income and expense, securities lending fee 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. 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.

In 2003, additional interest income of $61 million representing one day's interest on the SOMA portfolio was accrued to reflect a change in interest accrual methods, of which $3 million was allocated to the Bank. Interest accruals and the amortization of premiums and discounts are now recognized beginning the day that a security is purchased and ending the day before the security matures or is sold. Previously, accruals and amortization began the day after the security was purchased and ended on the day that the security matured or was sold. The effect of this change was not material; therefore, it was included in the 2003 interest income.

e. BANK PREMISES, EQUIPMENT, AND SOFTWARE

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 two to fifty years. 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. Costs incurred for software, either developed internally or acquired for internal use, during the application development stage are capitalized based on the cost of direct services and materials associated with designing, coding, installing, or testing software. Capitalized software costs are amortized on a straight-line basis over the estimated useful lives of the software applications, which range from two to five years.

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 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 (the Chairman of the Board of Directors of each Reserve Bank) 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 2003, the Federal Reserve Act was amended to expand the assets eligible to be pledged as collateral security to include all Federal Reserve Bank assets. Prior to the amendment, only gold certificates, special drawing rights certificates, U.S. government and federal agency securities, securities purchased under agreements to resell, loans to depository institutions, and investments denominated in foreign currencies could be pledged as collateral. The collateral value is equal to the book value of the collateral tendered, with the exception of securities, whose collateral value is equal to the par value of the securities tendered. The par value of securities pledged for securities sold under agreements to repurchase is similarly deducted. 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 sufficient 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 United States government.

The "Federal Reserve notes outstanding, net" account represents the Bank's Federal Reserve notes outstanding reduced by its currency holdings of $4,740 million, and $4,417 million at December 31, 2003 and 2002, 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 changes, 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. Pursuant to Section 16 of the Federal Reserve Act, Reserve Banks are required by the Board of Governors to transfer to the U.S. Treasury as interest on Federal Reserve notes 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.

In the event of losses or a substantial increase in capital, payments to the U.S. Treasury are suspended until such losses are recovered through subsequent earnings. Weekly payments to the U.S. Treasury may vary significantly.

j. INCOME AND COSTS 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.

k. TAXES

The Reserve Banks are exempt from federal, state, and local taxes, except for taxes on real property. The Bank's real property taxes were $2 million for each of the years ended December 31, 2003 and 2002, and are reported as a component of "Occupancy expense."

l. RECENT ACCOUNTING DEVELOPMENTS

In May 2003, the Financial Accounting Standards Board issued SFAS No. 150, "Accounting for Certain Financial Instruments with Characteristics of both Liabilities and Equity." SFAS No. 150, which will become applicable for the Bank in 2004, establishes standards for how an issuer classifies and measures certain financial instruments with characteristics of both liabilities and equity and imposes certain additional disclosure requirements. When adopted, there may be situations in which the Bank has not yet processed a member bank's application to redeem its Reserve Bank stock. In those situations, this standard requires that the portion of the capital paid-in that is mandatorily redeemable be reclassified as debt.

m. 2003 RESTRUCTURING CHARGES

In 2003, the System restructured several operations, primarily in the check and cash services. The restructuring included streamlining the management and support structures, reducing staff, decreasing the number of processing locations, and increasing processing capacity in the remaining locations.

Footnote 10 describes the restructuring and provides information about the Bank's costs and liabilities associated with employee separations and contract terminations. The costs associated with the write-down of certain Bank assets are discussed in footnote 6. Costs and liabilities associated with enhanced pension benefits for all Reserve Banks are recorded on the books of the FRBNY as discussed in footnote 8 and those associated with the Bank's enhanced postretirement benefits are disclosed in footnote 9.

4. U.S. GOVERNMENT AND FEDERAL AGENCY SECURITIES

Securities bought outright are held in the SOMA at the FRBNY. An undivided interest in SOMA activity and the related premiums, discounts, and income, with the exception of securities purchased under agreements to resell, 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 4.686 percent and 5.517 percent at December 31, 2003 and 2002, respectively.

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

	2003	2002
Par value:		
Federal agency	$ —	$ 1
U.S. government:		
Bills	11,472	12,507
Notes	15,152	16,436
Bonds	4,614	5,784
Total par value	31,238	34,728
Unamortized premiums	459	594
Unaccreted discounts	(42)	(58)
Total allocated to Bank	$ 31,655	$ 35,264

The total of SOMA securities bought outright was $675,569 million and $639,125 million at December 31, 2003 and 2002, respectively.

As noted in footnote 3, the FRBNY replaced MSP transactions with securities sold under agreements to repurchase in December 2002. At December 31, 2003 and 2002, securities sold under agreements to repurchase with a contract amount of $25,652 million and $21,091 million, respectively, were outstanding, of which $1,202 million and $1,164 million were allocated to the Bank. At December 31, 2003 and 2002, securities sold under agreements to repurchase with a par value of $25,658 million and $21,098 million, respectively, were outstanding, of which $1,202 million and $1,164 million were allocated to the Bank.

The maturity distribution of U.S. government securities bought outright and securities sold under agreements to repurchase, that were allocated to the Bank at December 31, 2003, was as follows (in millions):

Maturities of Securities Held	U.S. Government Securities (Par value)	Securities Sold Under Agreements to Repurchase (Contract amount)
Within 15 days	$ 2,237	$ 1,202
16 to 90 days	6,529	—
91 days to 1 year	7,688	—
Over 1 year to 5 years	8,765	—
Over 5 years to 10 years	2,404	—
Over 10 years	3,615	—
Total	$ 31,238	$ 1,202

At December 31, 2003 and 2002, U.S. government securities with par values of $4,426 million and $1,841 million, respectively, were loaned from the SOMA, of which $207 million and $102 million were allocated to the Bank.

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 purchased 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 8.381 percent and 9.053 percent at December 31, 2003 and 2002, respectively.

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

	2003	2002
European Union Euro:		
Foreign currency deposits	$ 576	$ 505
Government debt instruments including agreements to resell	343	299
Japanese Yen:		
Foreign currency deposits	123	162
Government debt instruments including agreements to resell	615	558
Accrued interest	8	7
Total	$ 1,665	$ 1,531

Total investments denominated in foreign currencies were $19,868 million and $16,913 million at December 31, 2003 and 2002, respectively.

The maturity distribution of investments denominated in foreign currencies which were allocated to the Bank at December 31, 2003, was as follows (in millions):

Maturities of Investments Denominated in Foreign Currencies	
Within 1 year	$ 1,529
Over 1 year to 5 years	108
Over 5 years to 10 years	28
Over 10 years	—
Total	$ 1,665

At December 31, 2003 and 2002, there were no outstanding F/X swaps or material open foreign exchange contracts.

At December 31, 2003 and 2002, the warehousing facility was $5,000 million, with no balance outstanding.

6. BANK PREMISES, EQUIPMENT, AND SOFTWARE

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

	2003	2002
Bank premises and equipment:		
Land	$ 7	$ 7
Buildings	151	150
Building machinery and equipment	46	45
Construction in progress	4	2
Furniture and equipment	69	71
Subtotal	$ 277	$ 275
Accumulated depreciation	(97)	(93)
Bank premises and equipment, net	$ 180	$ 182
Depreciation expense, for the years ended	$ 11	$ 11

The Bank leases unused space to outside tenants. Those leases have terms ranging from one to 12 years. Rental income from such leases was $1 million for each of the years ended December 31, 2003 and 2002. Future minimum lease payments under noncancelable agreements in existence at December 31, 2003, were (in millions):

2004	$ 1
2005	1
2006	1
2007	1
2008	1
Thereafter	4
	$ 9

The Bank has capitalized software assets, net of amortization, of $40 million and $32 million at December 31, 2003 and 2002, respectively. Amortization expense was $6 million and $1 million for the years ended December 31, 2003 and 2002, respectively.

Assets impaired as a result of the Bank's restructuring plan, as discussed in footnote 10, and the Bank's decision to discontinue an ongoing technology project include software, building, leasehold improvements, furniture, and equipment. Asset impairment losses of $2 million for the period ending December 31, 2003 were determined using fair values based on quoted market values or other valuation techniques and are reported as a component of "Other expenses."

7. COMMITMENTS AND CONTINGENCIES

At December 31, 2003, the Bank was obligated under noncancelable leases for premises and equipment with terms ranging from one to approximately four years. These leases provide for increased rental payments 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 $1 million for each of the years ended December 31, 2003 and 2002. Certain of the Bank's leases have options to renew.

Future minimum rental payments under noncancelable operating leases and capital leases, net of sublease rentals, with terms of one year or more, at December 31, 2003, were (in thousands):

	Operating
2004	$ 144
2005	147
2006	151
2007	102
2008	—
Thereafter	—
	$ 544

At December 31, 2003, the Bank had other commitments and long-term obligations in excess of one year totaling $26 million, $17 million of which had been recognized.

In addition, at December 31, 2003, the Bank, acting on behalf of the Reserve Banks, had contractual commitments through the year 2008 totaling $58 million, $50 million of which had been recognized. These contracts represent equipment, maintenance, software, and other miscellaneous costs for Check operations and the Check Modernization project that will be allocated annually to other Reserve Banks. It is estimated that the Bank's allocated share will be $2 million.

Under the Insurance Agreement of the Federal Reserve Banks dated as of 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 one 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, 2003 or 2002.

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"). In addition, certain Bank officers participate in the Supplemental Employee Retirement Plan ("SERP").

The System Plan is a multi-employer plan with contributions fully funded by participating employers. Participating employers are the Federal Reserve Banks, the Board of Governors of the Federal Reserve System, and the Office of Employee Benefits of the Federal Reserve Employee Benefits System. No separate accounting is maintained of assets contributed by the participating employers. The FRBNY acts as a sponsor of the Plan for the System and the costs associated with the Plan are not redistributed to the Bank. The Bank's projected benefit obligation and net pension costs for the BEP and the SERP at December 31, 2003 and 2002, 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, 2003 and 2002, 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 costs are actuarially determined using a January 1 measurement date.

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

	2003	2002
Accumulated postretirement benefit obligation at January 1	$ 44.5	$ 40.8
Service cost-benefits earned during the period	1.3	1.1
Interest cost of accumulated benefit obligation	2.9	2.8
Actuarial loss	9.9	1.6
Contributions by plan participants	0.2	0.2
Benefits paid	(2.7)	(2.0)
Accumulated postretirement benefit obligation at December 31	$ 56.1	$ 44.5

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

	2003	2002
Fair value of plan assets at January 1	$ —	$ —
Actual return on plan assets	—	—
Contributions by the employer	2.5	1.8
Contributions by plan participants	0.2	0.2
Benefits paid	(2.7)	(2.0)
Fair value of plan assets at December 31	$ —	$ —
Unfunded postretirement benefit obligation	$ 56.1	$ 44.5
Unrecognized prior service cost	0.8	0.9
Unrecognized net actuarial gain (loss)	(3.7)	6.3
Accrued postretirement benefit costs	$ 53.2	$ 51.7

Accrued postretirement benefit costs are reported as a component of "Accrued benefit costs."

At December 31, 2003 and 2002, the weighted average discount rate assumptions used in developing the benefit obligation were 6.25 percent and 6.75 percent, respectively.

For measurement purposes, a 10.00 percent annual rate of increase in the cost of covered health care benefits was assumed for 2004. Ultimately, the health care cost trend rate is expected to decrease gradually to 5.00 percent by 2011 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 one percentage point change in assumed health care cost trend rates would have the following effects for the year ended December 31, 2003 (in millions):

	One Percentage Point Increase	One Percentage Point Decrease
Effect on aggregate of service and interest cost components of net periodic postretirement benefit costs	$ 9.6	$ (7.5)
Effect on accumulated postretirement benefit obligation	0.9	(0.7)

The following is a summary of the components of net periodic post-retirement benefit costs for the years ended December 31 (in millions):

	2003	2002
Service cost-benefits earned during the period	$ 1.3	$ 1.1
Interest cost of accumulated benefit obligation	3.0	2.8
Amortization of prior service cost	(0.1)	(0.1)
Recognized net actuarial gain	(0.1)	(0.2)
Net periodic postretirement benefit costs	$ 4.1	$ 3.6

Net periodic postretirement benefit costs are reported as a component of "Salaries and other benefits."

The recognition of a special termination loss is the result of enhanced retirement benefits provided to employees during the restructuring described in footnote 10. Because the special termination benefits are less than $50 thousand, the amount is not displayed in the tables above.

Following the guidance of the Financial Accounting Standards Board, the Bank elected to defer recognition of the financial effects of the Medicare Prescription Drug Improvement and Modernization Act of 2003 until further guidance is issued. Neither the accumulated postretirement benefit obligation at December 31, 2003 nor the net periodic postretirement benefit cost for the year then ended reflect the effect of the Act on the plan.

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, disability benefits, and self-insured workers' compensation expenses. 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 were $7 million for each of the years ended December 31, 2003 and 2002. This cost is included as a component of "Accrued benefit costs." Net periodic postemployment benefit costs included in 2003 and 2002 operating expenses were $1 million for each of the years ended December 31, 2003 and 2002.

10. RESTRUCTURING CHARGES

In 2003, the Bank announced plans for restructuring to streamline operations and reduce costs, including consolidation of Check operations and staff reductions in various functions of the Bank. These actions resulted in the following business restructuring charges:

Major categories of expense (in millions):

	Total Estimated Costs	Accrued Liability 12/31/02	Total Charges	Total Paid	Accrued Liability 12/31/03
Employee separation	$ 1	$ —	$ 1	$ —	$ 1
Contract termination	—	—	—	—	—
Other	2	—	2	(2)	—
Total	$ 3	$ —	$ 3	$ (2)	$ 1

Employee separation costs are primarily severance costs related to reductions of approximately forty-four staff and are reported as a component of "Salaries and other benefits." Contract termination costs include the charges resulting from terminating existing lease and other contracts and are shown as a component of "Other expenses." Other costs, primarily related to the management of the System Check project, are also shown as a component of "Other expenses."

Costs associated with the write-downs of certain Bank assets, including software, buildings, leasehold improvements, furniture, and equipment are discussed in footnote 6. Costs associated with enhanced pension benefits for all Reserve Banks are recorded on the books of the FRBNY as discussed in footnote 8. Costs associated with enhanced postretirement benefits are disclosed in footnote 9.

Future costs associated with the restructuring that are not estimable and are not recognized as liabilities will be incurred in 2004.

The Bank anticipates substantially completing its announced plans by November 2004.

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as of December 31, 2003

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Board of Directors

as of December 31, 2003

Federal Reserve Banks each have a board of nine directors. Directors supervise the Bank's budget and operations, make recommendations on the primary credit rate, and, with the Board of Governors' approval, appoint the Bank's president, first vice president, and officers.

Class A directors are elected by and represent the interests of Fourth District member banks. Class B directors also are elected by member banks but represent the public interests of agriculture, commerce, industry, services, labor, and consumers. Class C directors are selected by the Board of Governors and also represent these public interests.

Directors serve for three years. Two Class C directors are designated by the Board of Governors as chairman and deputy chairman of the board. Directorships generally are limited to two successive terms to ensure that the individuals who serve the Federal Reserve System represent a diversity of backgrounds and experience.

The Cincinnati and Pittsburgh branch offices each have a board of seven directors who serve three-year terms. Board members are appointed by the Cleveland Fed and the Board of Governors.

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2003 Annual Report

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2005

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