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FEDERAL RESERVE BANK OF CLEVELAND • 2002 ANNUAL REPORT

CONTENTS

President's Foreword

The U.S. economy is still in the process of recovering from a recession that began over two years ago. The official arbiter of business cycle peaks and troughs, the National Bureau of Economic Research, has not yet decided when the recession ended — or indeed, whether it has ended. Many economists expect the latest recession's trough to be dated near the end of 2001, but considerable uncertainties about the future course of economic activity remain.

The most immediate problem confronting the economy is an issue facing not only our nation, but also the world. Terrorist activities and the strain of military conflict weigh heavily on people everywhere. In the economic realm of our lives, one consequence of these geopolitical tensions is a hesitation to take risks, particularly risks that involve significant capital expenditures. Capital spending requires confidence in the future because the benefits of long-lived investments accrue over time and, once made, are not easily reversed. Because we thrive in a global trading environment, the U.S. economy is especially sensitive to developments around the world.

Once geopolitical tensions ease, we will be in a better position to assess the economy's underlying condition. One aspect of economic performance that has received a great deal of attention in the past few years is price stability — though not for the usual reasons. Rather than worrying about inflation, some analysts have been assessing the likelihood of deflation and its consequences. Because deflation is rarely found in modern economies, its effects are not well understood.

David H. Hoag, chairman; Sandra Pianalto, first vice president; Jerry L. Jordan, president; and Robert W. Mahoney, deputy chairman.

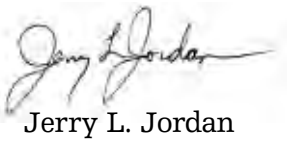
The Great Depression, as well as Japan's more recent experience with outright deflation for four years and a flat price level for eight, have convinced some central bankers that a little inflation is, in fact, desirable. In the essay that follows, we defend deflation as an occasionally acceptable macroeconomic outcome, so long as it is small in magnitude and accompanied by strong productivity growth.

The Bank could not have accomplished all that we did in 2002 without the guidance provided by the directors of our Cincinnati, Cleveland, and Pittsburgh offices and the members of our business and community bank advisory councils. We especially want to thank those directors who completed their terms of service on our boards in 2002. For their oversight and valuable contributions, we are truly grateful.

On our Cleveland Office board of directors, we are appreciative for the leadership of David H. Hoag (retired chairman, LTV Corporation), who served as deputy chairman and then chairman of the board during his term of service. During his tenure, Mr. Hoag was an integral part of the search committee that selected my successor as president, Sandra Pianalto. In addition, Tiney M. McComb (chairman and president, Heartland BancCorp) and David L. Nichols (president and chief operating officer, Rich's/Lazarus/Goldsmith's) completed their service on the Cleveland board.

On our Cincinnati Office board of directors, Mary Ellen Slone (chairman and chief executive officer, Meridian Communications), completed a term as a director. Special acknowledgment goes to George C. Juilfs (chairman and chief executive officer, SENCORP), who served as chairman of that board for two terms. On our Pittsburgh Office board of directors, Georgia Berner (president, Berner International Corporation) and Peter N. Stephans (chairman and chief executive officer, Trigon, Incorporated) each completed their second term as directors. We will miss the valuable contributions of all of our departing board members.

In addition, I wish to express my sincere appreciation to the officers and staff of the Federal Reserve Bank of Cleveland for their service during 2002 and throughout my tenure as president. The employees of the Cleveland Bank have impressed me with their commitment to efficiency, innovation, customer service, and good public policy. Collectively and continuously, they have strengthened our banking and payments systems, served the U.S. Treasury, and championed price stability. For all of these reasons and more, I sincerely thank them.



Jerry L. Jordan
President

Deflation

One of the most remarkable economic developments of the last two decades has been the overwhelming success of central banks in the industrialized world at reducing inflation. U.S. inflation, for instance, spiked at over 14 percent in 1980, but by 2002, the consumer price index had fallen to 2.3 percent, and inflation worries seemed nowhere to be found. This experience has not been unique to the United States. The International Monetary Fund's consumer price index for industrialized countries peaked in excess of 13 percent in 1980. In sharp contrast, inflation in the same nations registered 1.7 percent in 2002, an order of magnitude lower than the pace set two decades earlier.[1]

Today, however, some fear that central banks risk becoming victims of their own success in the war against inflation. Deflation has now replaced inflation as the principle concern of many in the central banking community.

In simple terms, deflation is the opposite of inflation; it describes a *persistent* decline in the general price level or, from another perspective, a persistent increase in the purchasing power of money. In the early 1980s, worrying about deflation was something like worrying about a shortage of pigeons in Trafalgar Square. But now, with annual inflation rates near zero, periodic deflations are much more plausible. In fact, many analysts take the recent experience of Japan—which is in the midst of a decade-long period of economic stagnation accompanied by a small deflation—as a cautionary example of deflation's dangers.

Just how dangerous is deflation? This question seems especially pertinent in light of modern central banks' near-universal commitment to low inflation and their increasing use of inflation targeting as an operational framework. If deflation is truly perilous, how low should inflation targets—formal or informal—be set? Is it more costly to undershoot than to overshoot the target?

In this essay, we offer our understanding of deflation and its economic impact. First, we conclude that deflation often is associated with economic problems that are not, in fact, intrinsic to deflation. For that reason, understanding the true costs of deflation requires that we isolate the issues that are particular to negative price-level growth. Furthermore, it is apparent that small, periodic deflations are not necessarily problematic, and that deflation can in fact be compatible with a healthy economy. That said, we also conclude there is a reasonable case to be made that central bankers should avoid large and lengthy periods of negative inflation. In our final analysis, the macroeconomic impact of negative inflation hinges on other key aspects of the environment in which deflation arises—particularly price expectations, the return to capital, and the central bank's operating choices.

CORRECTING MISPERCEPTIONS

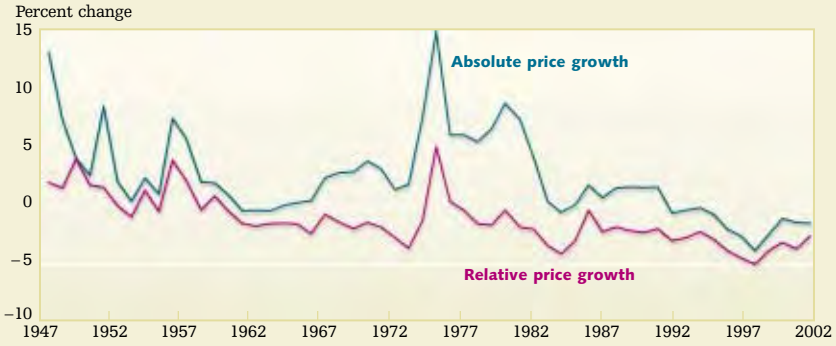
It is important to delineate what we mean by the term "deflation." Deflation refers to a persistent decline in the *average* of a set of prices. Most of us, of course, don't observe the average of all prices directly, but rather some (typically small) subset of prices. Price changes in our particular subset may reflect trends in all prices, or they may signal only a change in that subset's prices relative to all others. The distinction is important in our dynamic economy, in which some prices are always rising and some falling in relation to the average price level. In an environment where the average rate of price increase is large, the *relative* prices of some items may decline even if the dollar prices of individual goods or services do not actually fall. The lower the general inflation rate, however, the more likely it is that relative price changes will be associated with some falling prices. It is natural—for producers especially—to interpret these sorts of declining prices as deflation. In fact, this situation is no different from the case in which some goods and services prices rise, but less rapidly than others.

Producer equipment prices provide an interesting illustration of this point. Figure 1 shows the rates of absolute and relative price change in equipment and software investments since 1947. Although absolute prices have begun to decline recently, relative price declines have been the rule for most of the postwar period. This long-term trend reflects greater technological progress in the production of durable equipment—a boon to consumers and to the economy, even if it is sometimes a matter of consternation to the manufacturers of those goods.

1. Most recent data available, 12-month change from October 2001 to October 2002.

In addition to clarifying the distinction between relative price changes and deflation, this example highlights two important themes in our discussion of deflation: First, people attribute some economic consequences to deflation when deflation itself is not really the issue. Second, there are circumstances in which deflation can be a characteristic of a healthy economy—namely, during productivity-driven booms.

FIGURE 1: ABSOLUTE AND RELATIVE PRICE GROWTH IN EQUIPMENT AND SOFTWARE



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

THE CASE FOR DEFLATION

What is the most desirable rate of inflation? According to economic theory, a common answer is not "low," or "zero," but *negative*. In other words, in many cases economic theory implies that deflation is preferable to inflation, even to zero inflation.

The reasoning is fairly intuitive: Suppose that money consisted of nothing but cash. The opportunity cost of holding cash is the market interest rate—the return that people forgo by holding their funds in the form of cash instead of an interest-bearing bank account or a mutual fund. The higher the interest rate, the greater the incentive *not* to hold cash. In other words, high nominal interest rates act as an implicit tax on economic activities that require currency.

The tax interpretation is useful because it leads us to think explicitly in terms of public policy. In the production of any good, the "right" amount satisfies the condition that the marginal cost to the public equals the social marginal cost of producing the good. For cash, the social marginal cost of production is effectively zero; ideally, the cost of holding cash should be minimal as well. This requirement is met when the market nominal interest rate is extremely low. How can central banks engineer extremely low interest rates? Think of the nominal interest rate as the sum of the real return to saving and the expected inflation rate. Because the real return is usually positive, a very low nominal interest rate can be achieved only if the rate of decline in the price level matches the size of the real interest rate. In short, the optimal rate of change in the price level is negative—that is, deflation.

This particular justification for deflation is so prominent in monetary theory that it has a special name, the *Friedman rule*. To be sure, there are respectable counterarguments to this rule; in fact, we will present one later in this essay. But the Friedman rule has proven to be a remarkably resilient property of many economic models, and it remains the benchmark for discussing the "appropriate" rate of inflation. Why, then, do so many people blanch at the thought of deflation? And why do we not observe the Friedman rule in guiding the behavior of the world's central banks? Why would we, in fact, hesitate to suggest that the Friedman rule guide the course of U.S. monetary policy?

HISTORY CONFRONTS ECONOMIC THEORY

World economic history provides some pretty good clues as to why the prospect of deflation makes central bankers nervous. In their monumental work *A Monetary History of the United States, 1867–1960*, Milton Friedman and Anna Jacobson Schwartz observe that every *significant* real output decline in the United States has been associated with deflation.[2] The most notorious episode, of course, is the Great Depression: Between 1929 and 1933, the price level fell 24 percent (roughly 5 percent per year), while real GDP fell nearly 40 percent (table 1). Furthermore, both output and prices remained below their 1929 levels for the rest of the decade. Considering that the United Kingdom, Germany, and France simultaneously experienced significant output declines and deflation, central bankers' intense concern with deflation today is at least partly an outgrowth of this broad historical perspective.

Although the weight of professional opinion favors the idea that deflation played a central role in the Great Depression, the claim that price deflation was the initial *cause* is less obvious. The sharp initial decline in output that occurred in 1929–30 (13.1 percent) was accompanied by almost no price movement (table 1). If anything, the output data tend to lead the price data. Nevertheless, as we will point out later, the magnitude of the deflation may have played an important role in determining the magnitude and severity of the economic contraction.

Even if we grant that deflation was a central cause of the Great Depression, we should not forget the positive experiences the United States and other countries have had during periods of mild deflation. For example, from 1880 to 1896, the wholesale price level in the United States fell 30 percent—nearly 2 percent per year. Far from being a period of gloom and doom, this deflation accompanied a period of relative prosperity: Real income increased 85 percent over this time span, nearly 5 percent per year.[3]

The difference between the Great Depression and this earlier period, of course, is more than the magnitude of the price declines—the environments in which the price contractions occurred were completely different. The last half of the nineteenth century experienced what has become known as a "growth deflation." Textbooks roughly define inflation as "too much money chasing too few goods." Growth deflation, however, can be thought of as a situation in which too *little* money is chasing too *many* goods. During periods of rapid technological progress, output may expand quicker than the money supply, causing the price level to decline. The purchasing power of money increases, allowing people to buy more goods and services. By contrast, deficient money supply and the resulting price declines that occurred during the Great Depression hardly can be described as growth deflation.

TABLE 1: OUTPUT, PRICES, AND WAGES DURING THE GREAT DEPRESSION

	1929	1930	1931	1932	1933
Real GDP	100	86.9	77.6	64.0	60.9
GDP deflator	100	97.5	88.5	79.5	77.5
Nominal wage, manufacturing	100	99.1	94.1	83.5	79.9
Real wage, manufacturing	100	102.1	106.8	106.5	104.2
Real wage, nonmanufacturing, nonmining	100	98.6	96.9	92.4	85.6

NOTE: Data are indexed to 1929 values.

SOURCE: Harold L. Cole and Lee E. Ohanian, "Re-Examining the Contributions of Money and Banking Shocks to the U.S. Great Depression," in *NBER Macroeconomics Annual 2000,* edited by Ben Bernanke and Kenneth Rogoff (Cambridge, Mass.: MIT Press, 2001).

Rather than exhuming the bodies of history, why not consider a few contemporary cases? Japan, still struggling through a decade-long period of subpar growth, is cited most often in the case against deflation. From 1992 through 2001, that nation's real GDP growth averaged a mere 1 percent per year. The price level fell at an average rate of about ½ percent per year during that period, and, by the beginning of 2003, Japan's economy had experienced deflation in four of the previous five years (table 2).

2. Milton Friedman and Anna Jacobson Schwartz, *A Monetary History of the United States 1867–1960* (Princeton, N.J.: Princeton University Press, 1963).

3. For a discussion of this period in the United States and Canada, see Michael D. Bordo and Angela Redish, "Is Deflation Depressing? Evidence from the Classical Gold Standard," National Bureau of Economic Research, working paper no. w9520, March 2003.

How prominent a role does deflation play in the explanation of Japan's poor economic performance? Although that country's economic malaise appears to have been triggered by other factors (such as a malfunctioning banking system), many analysts believe mild deflation has inhibited its recovery. This interpretation is reinforced by the seeming impotence of monetary policy—with nominal interest rates near zero—to reignite the economy.

TABLE 2: OUTPUT AND PRICES IN CHINA, 1990–2002 (percent change)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Real GNP	4.2	9.1	14.1	13.1	12.6	9.0	9.8	8.6	7.8	7.2	8.4	7.0	n.a.
General retail price index	2.1	3.0	5.3	13.0	21.7	14.8	6.1	0.7	–2.5	–3.0	–1.5	–0.8	–1.3

TABLE 3: OUTPUT AND PRICES IN JAPAN, 1990–2002 (percent change)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Real GDP	5.2	3.3	0.9	0.4	1.0	1.9	3.6	1.8	–1.2	0.2	2.1	0.8	0.6
Consumer price index	3.1	3.3	1.7	1.3	0.7	–0.1	0.1	1.7	0.7	–0.3	–0.7	–0.8	–0.9

SOURCES: China National Bureau of Statistics; China State Statistical Bureau; Japan Cabinet Office; Japan Ministry of Public Management, Home Affairs, Posts, and Telecommunications; and Haver Analytics.

But the very visible example of Japan may have overshadowed a neighboring counterexample. Those who believe that deflation is everywhere and always associated with recession must account for the situation in the People's Republic of China, where real GDP has been growing between 6 percent and 8 percent per annum for several years, despite deflation (table 3).

As we will see, the contrasts between Japan and China—a struggling, mature economy versus a robust, developing country with a relatively small capital stock (hence, high return to investment)—are central to our assessment of the impact of falling prices. At this point, however, several questions remain: To the extent that deflation may emerge at some point in the United States, which experiences provide a better reference point, the United States of the 1880s or the 1930s, China, or Japan today? When should central bankers be concerned about deflation? To answer these questions, it is necessary to look more closely at some of the causal mechanisms that economists offer to explain how deflation contributes to output declines. We will find that, in hindsight, the problems that have been attributed to deflation are, in many instances—most instances, perhaps—the result of phenomena that are distinct from or not confined to deflation.

DEFLATION AND THE LABOR MARKET

Take, for example, the idea that nominal wages are downwardly rigid. This notion has a long history in macroeconomic analysis, appearing in John Maynard Keynes' 1936 analysis of the business cycle (which was itself motivated by the experience of the Great Depression).[4] Clearly, deflation is problematic in such an environment. If employers cannot reduce nominal wages, even when prices are falling, the relative cost of labor will increase and firms will respond by using fewer workers—with the attendant effect of income and production losses.

But the problems associated with downwardly rigid dollar wages are not confined to deflationary environments. Everyone's wages do not move in tandem. Keeping labor markets in balance requires that workers' wages continuously rise and fall in relation to one another, regardless of the overall inflation rate. Even when inflation is positive, changes in labor markets may require actual wage reductions for some workers. If employees are unwilling to accept nominal wage cuts, then their relative wages will increase, resulting in some

4. John Maynard Keynes, *The General Theory of Employment, Interest and Money* (New York: Harcourt Brace, 1964), p. 232.

employment loss. Lower inflation obviously increases the number of workers affected by downwardly sticky nominal wages—and perhaps the magnitude matters—but deflation does not change the nature of the problem. It is reasonable to suppose that the economic disruptions are nearly as large at low positive inflation rates as they would be at small deflation rates.

In any case, nominal wages may not be as downwardly sticky as one might suspect, especially in situations where the economic burden of not adjusting nominal payments is particularly high. Evidence indicates that during the Great Depression, for example, nominal wages did decline. One recent study suggests that during the Depression, the aggregate real wage actually *decreased* 3 percent, implying that nominal wages fell more than the price level.[5]

DISTINGUISHING DEFLATION FROM DISINFLATION

The tendency to blame deflation for economic distress extends as much—or more—to capital markets. In 1933, the famous economist Irving Fisher proposed an explanation known as "debt-deflation" as the root cause of the Great Depression.[6] Modern versions of the debt-deflation story begin with the observation that firms typically rely on external funds to finance current operations and investment spending, and the cost of these funds is inversely related to the firm's position on its balance sheet. Firms with substantial positive net worth can obtain financing at a low cost, while the converse is true of firms with weak asset positions. Shocks that redistribute wealth away from firms may impede their ability to borrow and invest, creating a barrier to productive activity that contributes to overall economic weakness.

A similar story holds true for net-debtor households: A shock that weakens these consumers' net worth positions will impair their ability to service their existing debt burdens and borrow for additional consumption. Conventional textbook macroeconomics points to a subsequent decline in consumer spending as a source of output decline. More sophisticated treatments, however, might look to a surge in bankruptcies and more restrictive borrowing constraints as a drag on growth because of the associated reduction in productive financial intermediation. In either case, the health of private balance sheets is an essential component of macroeconomic fortunes.

How might deflation affect the balance sheets of businesses and consumers? In short, by inducing a redistribution of wealth from debtors to creditors. Falling prices imply an increase in the real debt burden of firms and households, weakening their financial condition and reducing the prospects for sustaining the pace of economic activities that rely on access to credit markets.

But the debt-deflation problem we've just described is not unique to episodes during which the general price level literally falls. It is also a problem when the rate of price-level change is below people's expectations. If borrowers and lenders expect the price level to march upward 10 percent per year (10 percent inflation), then a decline in the actual pace of price change to 5 percent (5 percent inflation) will distribute wealth away from borrowers and toward lenders. Unanticipated disinflation in the early 1980s and again in the early 1990s created just such a situation. In this respect, the effect of a drop in the inflation rate from 10 percent to 5 percent is the same as if the price level unexpectedly fell 5 percent (5 percent deflation) when everyone expected it to remain constant (zero inflation). Thus, the burden that deflation places on debtors stems from the fact that it is *unanticipated*, not from the deflation itself.

5. Harold L. Cole and Lee E. Ohanian, "Re-Examining the Contributions of Money and Banking Shocks to the U.S. Great Depression," in *NBER Macroeconomics Annual 2000*, edited by Ben Bernanke and Kenneth Rogoff (Cambridge, Mass.: MIT Press, 2001).

6. Irving Fisher, "The Debt-Deflation Theory of Great Depressions," *Econometrica*, vol. 1, no. 4 (1933), pp. 337–57.

THE CASE AGAINST DEFLATION

To this point, it may seem that we are reluctant to ascribe any negative effects at all to deflation. Thus far, we have not identified a set of economic links through which deflation could pose a *unique* macroeconomic risk. In our examples, deflation is inappropriately blamed because (1) it coincides with events that actually have little or nothing to do with deflation (relative price movements); (2) complications arise from institutional features that are not unique to deflation (as in downward inflexibility of wages); or (3) output losses following from unanticipated disinflation (a class of price-change outcomes in which deflation has no special status). Do any circumstances remain in which a perfectly anticipated, reasonably stable rate of deflation might pose a problem? Yes.

Recall that the nominal market interest rates we observe have two components: a real return to saving and an adjustment for the expected rate of price change. If the anticipated deflation rate is large enough and the real return to saving low enough, then nominal rates might plunge toward zero, and may even be "pressed" against that floor. This result, many believe, could create an undesirable macroeconomic outcome.[7]

If nominal interest rates fall to zero, the symmetry between inflation and deflation may break down. There is, presumably, no upper bound on nominal interest rates, but there is a *lower* bound: They cannot fall below zero. If the nominal interest rate were negative, no one would bother to hold the usual interest-bearing assets because the return from simply putting money under the mattress would be greater. Obviously, once nominal interest rates reach the zero bound, the central bank's capacity to reduce that rate is gone. Worse yet, once the nominal interest rate is zero, expectations of additional deflationary pressure mean that *real* interest rates can only move higher. This short-circuits the natural market processes that, under normal circumstances, would push real interest rates even lower. Rising real interest rates, engendered by growing deflationary expectations at the zero nominal interest rate bound, are the exact opposite of what the doctor would order in times of economic stress. Now the only way that real interest rates can be made to fall—thus spurring the market forces that contribute to a rebound in economic activity—is for the central bank to credibly engineer future *inflation*.

The central bank's inability to lower nominal rates that already reside at zero, along with the implications for real rates if deflationary pressures continued to build, is the strongest case against policies that engineer (or allow) persistently negative inflation rates. But just how strong a case is it?

ZERO INTEREST RATES AND THE LIQUIDITY TRAP

The large deflation of the Depression occurred because the (relatively inexperienced) Federal Reserve allowed the money supply to contract. This deflation was long enough and severe enough that it became embedded in people's expectations, and thus in nominal interest rates. Separately, the real interest rate—or the real return to capital—was also low because of forces that were depressing economic activity. Because the nominal interest rate is the sum of the real component and (in this case) a negative "premium" for expected deflation, short-term nominal interest rates were near zero during most of the Depression.

If low real interest rates and deflationary monetary policy contributed to the problem, why not simply expand the money supply, reversing the forces that set the wheels in motion in the first place? Unfortunately, this is a situation in which the normal processes don't necessarily work. The problem is that the increased money supply may have trouble finding its way out of banks and into the economy,

7. While the Friedman rule suggests that nominal interest rates should be very low, this analysis suggests that actually reducing them to zero could be problematic.

thereby preventing "reflation." Some observers maintain that Japan has been pursuing what it regards as an aggressively expansionary monetary policy for the past two years, but to no avail, because its approach has been too conventional.[8] Although nonstandard tactics might be more successful, their very idiosyncrasies illustrate why a central bank might be reluctant to try them. The challenge is to find ways for the increased money supply to move out of the banking system and into the economy.[9]

This problem may arise because, when the interest rate is zero, interest-bearing assets and money are nearly indistinguishable. Even if the central bank created more money, commercial banks would not necessarily lend this money. Banks could simply hold the money as reserves and earn the same return as if they loaned the money to those seeking to finance investment projects and consumption. This condition, or one like it, is sometimes referred to as the "liquidity trap."[10]

The only way for a central bank to get out of a liquidity trap, it seems, is to promise to significantly expand the money supply *both* today and in the future—and to deliver on that promise. With enough monetary expansion, some of this money eventually will find its way into the economy, increasing inflationary expectations and, in turn, nominal interest rates. This instrument is very blunt, however, and fine-tuning inflation expectations is extremely difficult even in the best of times. Overshooting is likely, and the cost of this inflationary policy may be the central bank's hard-won credibility.

THE CRUX OF THE PROBLEM

The practical relevance of the liquidity trap is a matter of considerable debate among economists and policymakers, and central banks have little experience with zero nominal interest rates. This brings us back to the central question posed earlier in this essay: How dangerous is deflation? Should we view it in light of the experience of the United States during the 1880s or China today? Or should we think of it more in the light of the United States during the 1930s and Japan today?

Perhaps the answer to these questions is "all of the above." The liquidity trap is not typically a problem in times of optimism and rapid growth. The key is the real interest rate: In good times, the productivity of capital is rising and the demand for funds to finance consumption and investment is high. In bad times, the opposite is true. Accordingly, real interest rates tend to rise during good times and fall during bad times. To the extent that zero nominal interest rates and liquidity traps represent the real dangers of deflation, the problems are most likely to occur in times of economic distress.

Deflation alone—even anticipated deflation—does not necessarily imply zero nominal interest rates and liquidity traps, provided the real interest rate is sufficiently positive (the normal state of affairs). In some sense, then, we have come full circle: There is nothing special about deflation in and of itself. The greater and more anticipated the pace of price-level decline, the greater the chance that we will find ourselves with a problem. Again, however, the danger is not deflation itself, but the liquidity traps that might arise when nominal interest rates approach zero.

8. Bennett McCallum discusses several nonstandard approaches in his paper "Japanese Monetary Policy, 1991–2001," *Federal Reserve Bank of Richmond Economic Quarterly*, vol. 89, no. 1 (2003), pp. 1–32.

9. Federal Reserve Governor Ben Bernanke suggests several ways that a central bank could operate if short-run policy rates hit zero. See "Deflation: Making Sure it 'It' Doesn't Happen Here," remarks before the National Economists' Club, Washington D.C., November 21, 2002, available at *http://www.federalreserve.gov/boarddocs/speeches/2002/ 20021121/default.htm*.

10. A formal model in which low nominal interest rates can dampen economic activity by reducing the level of financial intermediation can be found in Bruce Smith, "Taking Intermediation Seriously," *Journal of Money, Credit, and Banking*, forthcoming.

CONCLUSION

It seems certain to us that a good deal of deflation angst is misplaced. Some businessmen mistakenly fear deflation when it is only the relative prices of the goods or services they produce that are declining. Second, some of the disruptions attributed to deflation arise, not because the price level is actually falling, but because prices are rising more slowly than was anticipated. Unexpectedly low inflation raises the debt burdens of borrowers and the real labor costs to employers as much as unexpected deflation. Clearly, each of these effects can have a negative influence on aggregate economic activity, but they arise from the *unanticipated* nature of the price event, not deflation itself.

One of our goals in this essay has been to highlight situations in which deflation has been confounded with other circumstances and effects. We do so, not to argue that deflation is always innocuous, but to focus the discussion on the problems that are truly unique to negative rates of inflation. We conclude that deflation is not everywhere and always something to be feared and avoided. Nevertheless, we recognize that central bankers must be wary of circumstances in which nominal interest rates approach the zero bound.

We find that we are left with more questions than answers. If the implications of deflation differ with the context, should monetary policy be tailored to the specific types of deflation? Or is a one-size-fits-all policy approach the better alternative? In either case, what might the policy regimes look like?

Many economists believe so strongly that liquidity traps threaten the economy that they want central banks to avoid the zero interest rate bound altogether. Consequently, they advocate gearing policy to always avoid deflation—and even zero inflation as a further cushion. These supporters claim it is best to commit to low but positive inflation rates.

Other economists contend, however, that such a solution is unnecessarily restrictive. Should a few bad deflation experiences make central banks wary of any growth deflation? How strong is the evidence that small deflations are harmful, especially if the central bank can credibly commit to ensuring these episodes are short-lived? Should central banks avoid targeting near-zero inflation rates simply because doing so inevitably implies the actual inflation rate occasionally may be negative?

Positions in this debate obviously depend on one's view of how desirable deflation is in normal times, how dangerous one thinks liquidity traps are, and how quickly and credibly one believes central banks can act to avoid them. Countries whose central banks have explicit inflation targets already have had to decide whether to include zero in their target ranges and under what circumstances, if any, deflation is acceptable. In the United States, more attention is being paid to the desirability of inflation targeting and the setting of explicit, transparent goals for monetary policy.[11] Because participants in that discussion must come to terms with deflation, we hope this essay plays a constructive role in shaping the future course of U.S. monetary policy.

11. See, for example, Federal Reserve Governor Ben Bernanke's speech, "A Perspective on Inflation Targeting," presented at the Annual Washington Policy Conference of the National Association of Business Economists, Washington, D.C., March 25, 2003, available at *http://www.federalreserve.gov/boarddocs/speeches/2003/20030325/default.htm*.

FINANCIAL CONTENTS

MANAGEMENT'S REPORT ON RESPONSIBILITY FOR FINANCIAL REPORTING

March 5, 2003

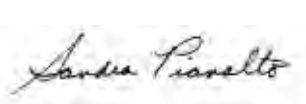
To the Board of Directors of the Federal Reserve Bank of Cleveland:

The management of the Federal Reserve Bank of Cleveland ("FRBC") 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, 2002 (the "Financial Statements"). The Financial Statements have been prepared in conformity with the accounting principles, policies, and practices established by the Board of Governors of the Federal Reserve System and as set forth in the Financial Accounting Manual for the Federal Reserve Banks ("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.

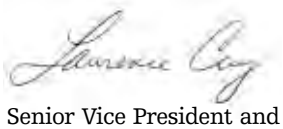
The management of the Federal Reserve Bank of Cleveland is responsible for maintaining an effective process of internal controls over financial reporting including the safeguarding of assets as they relate to the Financial Statements. Such internal controls are designed to provide reasonable assurance 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 Federal Reserve Bank of Cleveland 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 Federal Reserve Bank of Cleveland 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



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

REPORT OF INDEPENDENT ACCOUNTANTS ON FINANCIAL REPORTING

PricewaterhouseCoopers L.L.P.

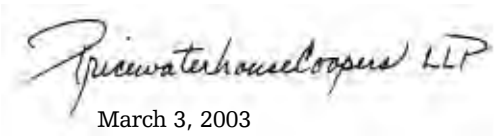
To the Board of Directors of the Federal Reserve Bank of Cleveland:

We have examined management's 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, 2002, based on criteria described in "Internal Control–Integrated Framework" issued by the Committee of Sponsoring Organizations of the Treadway Commission included in the accompanying Management's Assertion. FRB Cleveland's management is responsible for maintaining effective internal control over financial reporting and the safeguarding of assets as they relate to the financial statements. Our responsibility is to express an opinion on the 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 the internal control over financial reporting, testing, and evaluating the design and operating effectiveness of the 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 the internal control over financial reporting to future periods are subject to the risk that the internal control may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

In our opinion, management's assertion that the FRB 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, 2002, is fairly stated, in all material respects, based on criteria described in "Internal Control–Integrated Framework" issued by the Committee of Sponsoring Organizations of the Treadway Commission.



March 3, 2003
Cleveland, Ohio

REPORT OF INDEPENDENT ACCOUNTANTS ON FINANCIAL STATEMENTS

PricewaterhouseCoopers L.L.P.

To the Board 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, 2002 and 2001, 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 the 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 discussed in Note 3, the financial statements were prepared in conformity with the accounting principles, policies, and practices established by the Board of Governors of the Federal Reserve System. These principles, policies, and practices, which were designed to meet the specialized accounting and reporting needs of the Federal Reserve System, are set forth in the "Financial Accounting Manual for Federal Reserve Banks" and constitute a comprehensive basis of accounting other than accounting principles generally accepted in the United States.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Bank as of December 31, 2002 and 2001, and results of its operations for the years then ended, in conformity with the basis of accounting described in Note 3.

March 3, 2003
Cleveland, Ohio

Comparative Financial Statements

STATEMENTS OF CONDITION
(in millions)

	As of December 31, 2002	As of December 31, 2001
ASSETS		
Gold certificates	$ 522	$ 538
Special drawing rights certificates	104	104
Coin	43	61
Items in process of collection	764	219
U.S. government and federal agency securities, net	35,264	32,885
Investments denominated in foreign currencies	1,531	996
Accrued interest receivable	301	334
Bank premises and equipment, net	182	181
Other assets	64	62
Total assets	$ 38,775	$ 35,380
LIABILITIES AND CAPITAL		
Liabilities:		
Federal Reserve notes outstanding, net	$ 28,170	$ 30,620
Securities sold under agreements to repurchase	1,164	—
Deposits:		
Depository institutions	1,393	1,103
Other deposits	4	4
Deferred credit items	685	224
Interest on Federal Reserve notes due U.S. Treasury	71	28
Interdistrict settlement account	5,818	2,008
Accrued benefit costs	58	56
Other liabilities	8	7
Total liabilities	$ 37,371	$ 34,050
Capital:		
Capital paid-in	702	665
Surplus	702	665
Total capital	1,404	1,330
Total liabilities and capital	$ 38,775	$ 35,380

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

STATEMENTS OF INCOME
(in millions)

	For the year ended December 31, 2002	For the year ended December 31, 2001
Interest income:		
Interest on U.S. government and federal agency securities	$ 1,410	$ 1,708
Interest on investments denominated in foreign currencies	24	22
Interest on loans to depository institutions	—	1
Total interest income	1,434	1,731
Interest expense:		
Interest expense on securities sold under agreements to repurchase	1	—
Net interest income	1,433	1,731
Other operating income (loss):		
Income from services	66	65
Reimbursable services to government agencies	26	23
Foreign currency gains (losses), net	194	(98)
U.S. government securities gains, net	4	18
Other income	4	5
Total other operating income	$ 294	$ 13
Operating expenses:		
Salaries and other benefits	86	81
Occupancy expense	11	13
Equipment expense	13	12
Assessments by Board of Governors	40	39
Other expenses	46	55
Total operating expenses	196	200
Net income prior to distribution	$ 1,531	$ 1,544
Distribution of net income:		
Dividends paid to member banks	$ 42	$ 30
Transferred to surplus	37	193
Payments to U.S. Treasury as interest on Federal Reserve notes	1,452	1,321
Total distribution	$ 1,531	$ 1,544

STATEMENTS OF CHANGES IN CAPITAL
(in millions)

For the years ended December 31, 2002 and December 31, 2001

	Capital paid-in	Surplus	Total capital
Balance at January 1, 2001 (9.4 million shares)	$ 472	$ 472	$ 944
Net income transferred to surplus	—	193	193
Net change in capital stock issued (3.9 million shares)	193	—	193
Balance at December 31, 2001 (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

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 a portion 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.

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 to 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 as 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. Therefore, a Statement of Cash Flows would not provide any additional useful information. There are no other significant differences between the policies outlined in the Financial Accounting Manual and GAAP.

Effective January 2001, the System implemented procedures to eliminate the sharing of costs by Reserve Banks for certain services a Reserve Bank may provide on behalf of the System. Major services provided for the System by the Bank, for which the costs were not redistributed to the other Reserve Banks, include: Retail Payment Office, Savings Bonds Software, Check Standardization Project, Cash Materials Handling Software, Audit Application Competency Center, and Electronic Access Products.

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 upon 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 SDRs, at the direction of the U.S. Treasury, for the purpose of financing SDR certificate 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 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, and currently all are considered collectible and fully collateralized. 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. Reserve Banks retain the option to impose a surcharge above the basic rate in certain circumstances. There were no outstanding loans to depository institutions at December 31, 2002 and 2001.

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 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 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 that it may need for intervention operations to support the dollar and give the partner foreign central bank temporary access to dollars it may need to support its own currency. Drawings under 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 which 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 can 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 (losses), 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. Income from securities lending transactions undertaken by the FRBNY are also allocated to each Reserve Bank. Securities purchased under agreements to resell and unrealized gains and losses on the revaluation of foreign currency holdings under F/X swaps and warehousing arrangements are allocated to the FRBNY and not to other Reserve Banks.

e. Bank Premises, 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. New assets, major alterations, renovations and improvements are capitalized at cost as additions to the asset accounts. Maintenance, repairs and minor replacements are charged to operations in the year incurred. 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.

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 accordance with the Federal Reserve Act, 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 are pledged as collateral for net Federal Reserve notes outstanding. 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, and securities purchased under agreements to resell, which are valued at the contract amount. 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 which 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 $4,417 million and $4,316 million at December 31, 2002 and 2001, 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 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, which are reported as a component of "Occupancy expense."

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 5.517 percent and 5.854 percent at December 31, 2002 and 2001, respectively.

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

	2002	2001
Par value:		
Federal agency	$ 1	$ 1
U.S. government:		
Bills	12,507	10,659
Notes	16,436	15,569
Bonds	5,784	6,069
Total par value	34,728	32,298
Unamortized premiums	594	662
Unaccreted discounts	(58)	(75)
Total allocated to Bank	$ 35,264	$ 32,885

Total SOMA securities bought outright were $639,125 million and $561,701 million at December 31, 2002 and 2001, respectively.

The maturity distribution of U.S. government and federal agency securities bought outright, which were allocated to the Bank at December 31, 2002, was as follows (in millions):

	Par value		
Maturities of Securities Held	U.S. government securities	Federal agency obligations	Total
Within 15 days	$ 1,514	$ —	$ 1,514
16 days to 90 days	8,509	—	8,509
91 days to 1 year	7,826	1	7,827
Over 1 year to 5 years	9,532	—	9,532
Over 5 years to 10 years	2,941	—	2,941
Over 10 years	4,405	—	4,405
Total	$ 34,727	$ 1	$ 34,728

As mentioned in footnote 3, in December 2002, the FRBNY replaced MSP transactions with securities sold under agreements to repurchase. At December 31, 2002, securities sold under agreements to repurchase with a contract amount of $21,091 million and a par value of $21,098 million were outstanding, of which $1,164 million and $1,164 million, respectively, were allocated to the Bank. At December 31, 2001, MSP transactions involving U.S. government securities with a par value of $23,188 million were outstanding, of which $1,358 million was allocated to the Bank. Securities sold under agreements to repurchase and MSP transactions are generally overnight arrangements.

At December 31, 2002 and 2001, U.S. government securities with par values of $1,841 million and $7,345 million, respectively, were loaned from the SOMA, of which $102 million and $430 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 9.053 percent and 6.844 percent at December 31, 2002 and 2001, 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):

	2002	2001
European Union Euro:		
Foreign currency deposits	$ 505	$ 314
Government debt instruments including agreements to resell	299	185
Japanese Yen:		
Foreign currency deposits	162	129
Government debt instruments including agreements to resell	558	364
Accrued interest	7	4
Total	$ 1,531	$ 996

Total investments denominated in foreign currencies were $16,913 million and $14,559 million at December 31, 2002 and 2001, respectively.

The maturity distribution of investments denominated in foreign currencies which were allocated to the Bank at December 31, 2002, was as follows (in millions):

Maturities of investments denominated in foreign currencies	
Within 1 year	$ 1,413
Over 1 year to 5 years	82
Over 5 years to 10 years	36
Over 10 years	—
Total	$ 1,531

At December 31, 2002 and 2001, there were no open foreign exchange contracts or outstanding F/X swaps.

At December 31, 2002 and 2001, the warehousing facility was $5,000 million, with zero balance outstanding.

6. BANK PREMISES AND EQUIPMENT

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

	2002	2001
Bank premises and equipment:		
Land	$ 7	$ 7
Buildings	150	149
Building machinery and equipment	45	43
Construction in progress	2	1
Furniture and equipment	71	73
	275	273
Accumulated depreciation	(93)	(92)
Bank premises and equipment, net	$ 182	$ 181

Depreciation expense was $11 million and $12 million for the years ended December 31, 2002 and 2001, respectively.

The Bank leases unused space to outside tenants. Those leases have terms ranging from one to thirteen years. Rental income from such leases was $1 million for each of the years ended December 31, 2002 and 2001. Future minimum lease payments under noncancelable agreements in existence at December 31, 2002, were (in millions):

2003	$ 1
2004	1
2005	1
2006	1
2007	1
Thereafter	5
	$ 10

7. COMMITMENTS AND CONTINGENCIES

At December 31, 2002, the Bank was obligated under noncancelable leases for premises and equipment with terms ranging from one to approximately five years. These leases provide for increased rentals based upon increases in real estate taxes, operating costs or selected price indices.

Rental expense under operating leases for certain operating facilities, warehouses, and data processing and office equipment (including taxes, insurance and maintenance when included in rent), net of sublease rentals, was $1 million for each of the years ended December 31, 2002 and 2001. 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, 2002, were (in thousands):

	Operating
2003	$ 140
2004	144
2005	147
2006	151
2007	102
Thereafter	0
	$ 684

At December 31, 2002, the Bank, acting on behalf of the Reserve Banks, had contractual commitments through the year 2005 totaling $27 million, none of which has 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 allocation share will be $6 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 1 percent of the capital paid-in of the claiming Reserve Bank, up to 50 percent of the total capital paid-in of all Reserve Banks. Losses are borne in the ratio that a Reserve Bank's capital paid-in bears to the total capital paid-in of all Reserve Banks at the beginning of the calendar year in which the loss is shared. No claims were outstanding under such agreement at December 31, 2002 or 2001.

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"), and certain Bank officers participate in a Supplemental Employee Retirement Plan ("SERP"). The System Plan is a multi-employer plan with contributions fully funded by participating employers. No separate accounting is maintained of assets contributed by the participating employers. The Bank's projected benefit obligation and net pension costs for the BEP at December 31, 2002 and 2001, and for the SERP at December 31, 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, 2002 and 2001, 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):

	2002	2001
Accumulated postretirement benefit obligation at January 1	$ 40.8	$ 39.4
Service cost-benefits earned during the period	1.1	1.0
Interest cost of accumulated benefit obligation	2.8	2.7
Actuarial loss	1.6	0.4
Contributions by plan participants	0.2	0.2
Benefits paid	(2.0)	(1.9)
Plan amendments	—	(1.0)
Accumulated postretirement benefit obligation at December 31	$ 44.5	$ 40.8

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):

	2002	2001
Fair value of plan assets at January 1	$ —	$ —
Actual return on plan assets	—	—
Contributions by the employer	1.8	1.7
Contributions by plan participants	0.2	0.2
Benefits paid	(2.0)	(1.9)
Fair value of plan assets at December 31	$ —	$ —
Unfunded postretirement benefit obligation	$ 44.5	$ 40.8
Unrecognized initial net transition asset (obligation)	—	—
Unrecognized prior service cost	0.9	1.0
Unrecognized net actuarial gain	6.3	8.2
Accrued postretirement benefit costs	$ 51.7	$ 50.0

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

At December 31, 2002 and 2001, the weighted average discount rate assumptions used in developing the benefit obligation were 6.75 percent and 7.00 percent, respectively.

For measurement purposes, a 9.00 percent annual rate of increase in the cost of covered health care benefits was assumed for 2003. Ultimately, the health care cost trend rate is expected to decrease gradually to 5.00 percent by 2008, 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, 2002 (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	$ 0.8	$ (0.6)
Effect on accumulated postretirement benefit obligation	7.5	(5.9)

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

	2002	2001
Service cost-benefits earned during the period	$ 1.1	$ 1.0
Interest cost of accumulated benefit obligation	2.8	2.7
Amortization of prior service cost	(0.1)	—
Recognized net actuarial loss	(0.2)	(0.6)
Net periodic postretirement benefit costs	$ 3.6	$ 3.1

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

Postemployment Benefits

The Bank offers benefits to former or inactive employees. Postemployment benefit costs are actuarially determined and include the cost of medical and dental insurance, survivor income, 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 at December 31, 2002 and 2001, were $7 million and $6 million, respectively. This cost is included as a component of "Accrued benefit costs." Net periodic postemployment benefit costs included in 2002 and 2001 operating expenses were $1 million for each of the years ended December 31, 2002 and 2001.

10. SUBSEQUENT EVENT

In January 2003, the System announced plans to restructure its check collection operations. The restructuring plans include streamlining the check management structure, reducing staff, decreasing the number of check-processing locations, and increasing processing capacity in other locations. The restructuring, which is expected to begin in 2003 and conclude by the end of 2004, will result in the Bank discontinuing its check operations at the Pittsburgh office, increasing its check processing capacity at the Cleveland and Cincinnati offices, and consolidating its check adjustment function at the Cleveland office. At this time, the Reserve Banks have not developed detailed estimates of the cost of the restructuring plan in the aggregate or for the individual Reserve Banks affected.

Officers and Consultants

As of December 31, 2002

Jerry L. Jordan
President and Chief Executive Officer

Sandra Pianalto
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Lawrence Cuy
Senior Vice President
Financial Management Services, Strategic Planning, Information Technology, COSO

R. Chris Moore
Senior Vice President
Supervision and Regulation, Credit Risk Management, Data Services

Robert W. Price
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Retail Payments Office, National Check Automation and Operations, National Product Development

Susan G. Schueller
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Audit

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Cash, Treasury Services, Savings Bonds, Facilities, Information Security, Protection, Business Continuity

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Research, Corporate Communications, Community Affairs

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Check, Marketing, Electronic Payments, Customer Satisfaction

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Savings Bonds, EZ Clear

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Vice President and Economist
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Supervision and Regulation

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Corporate Communications and Community Affairs

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Legal

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Cincinnati Location Officer, Protection, Business Continuity

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Electronic Payments

David P. Jager
Vice President
Cash, Treasury Services, Electronic Payments

Stephen H. Jenkins
Vice President
Supervision and Regulation

Rayford P. Kalich
Vice President
Accounting, Budget, Purchasing, Strategic Planning, COSO

Stephen J. Ong
Vice President
Supervision and Regulation

David E. Rich
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Information Technology

Edward E. Richardson
Vice President
Sales, Marketing, National Account Program

Terrence J. Roth
Vice President
Retail Payments Office, Check Products

Robert B. Schaub
Vice President
Pittsburgh Location Officer, Protection, Business Continuity

Gregory L. Stefani
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Credit Risk Management, Data Services

Edward J. Stevens
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Research

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Vice President
Facilities, Business Continuity

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Vice President
Cleveland Check Operations and Check Adjustments

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Vice President
Cincinnati and Columbus Check Operations

Darell R. Wittrup
Vice President
Accounting, Billing

Douglas A. Banks
Assistant Vice President and Consumer Affairs Officer
Supervision and Regulation

Kelly A. Banks
Assistant Vice President and Public Information Officer
Corporate Communications and Public Information

Stephen J. Geers
Assistant Vice President
Marketing, National Account Program

Patrick Geyer
Assistant Vice President
Electronic Payments, Standard Cash Application User Support

Kenneth J. Good
Assistant Vice President
Pittsburgh Check Operations

Felix Harshman
Assistant Vice President
Expense Accounting, Budget

Joseph G. Haubrich
Consultant and Economist
Research

Jon C. Jeswald
Assistant Vice President
Retail Payments Office

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Assistant Vice President
Supervision and Regulation

Kenneth E. Kennard
Assistant Vice President
Protection

Dean A. Longo
Consultant
Information Technology

Martha Maher
Assistant Vice President
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Supervision and Regulation

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Human Resources

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Cincinnati Check Operations

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Office of the Corporate Secretary

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Assistant Vice President
Information Technology

Michael Vangelos
Assistant Vice President
Information Security

Lisa Vidacs
Assistant Vice President
Cleveland and Pittsburgh Cash Operations

2002 Operational Highlights

The mission of the Federal Reserve Bank of Cleveland is to enable the economy to achieve maximum sustainable growth by preserving the purchasing power of the dollar, promoting a strong financial system, and providing efficient and innovative payments solutions to financial institutions, the U.S. Treasury, and the public. This section summarizes the Bank's operational achievements in these three areas.

ECONOMIC RESEARCH AND MONETARY POLICY

In 2002, economic developments—including rising oil prices, low inflation, low interest rates, and growing geopolitical tensions—presented new challenges and opportunities in fostering stable prices and sustainable economic growth through monetary policy. In this environment of rapid change, anticipating and preparing for such change is one of the Bank's key responsibilities to the Fourth District and to the nation.

The economic research staff are respected contributors to the discourse on topics that concern the Federal Reserve System and promote constructive discussion of those issues in the public domain. Research staff published articles and papers on monetary, economic, and banking topics in the Bank's annual report, in its *Economic Commentary* series, and in *Policy Discussion Papers* and working papers, as well as respected academic journals. In addition, the Bank hosted a conference (together with the *Journal of Money, Credit, and Banking*) on "Recent Developments in Monetary Economics."

One of the Federal Reserve Bank of Cleveland's key strategic initiatives has been the development of the Central Bank Institute. The Institute was established in 2001 to foster greater understanding of the monetary policy, supervisory, and payments aspects of central banking by promoting research and dialogue and by forging partnerships among central banks. In 2002, the Institute hosted three conferences on current monetary policy research and cosponsored two additional conferences with the Swiss National Bank and the Chicago Reserve Bank; altogether, 150 scholars took part in these programs. As part of its staff exchange program, the Institute hosted scholars from the central banks of Sweden, Austria, Azerbaijan, and the Kyrgyz Republic, while Cleveland Fed economists traveled to the Sveriges Riksbank, Bank of England, and Deutsche Bundesbank.

Public outreach is one of the Federal Reserve Bank of Cleveland's key objectives, and the public tour program and speakers bureau are the cornerstones of that program. In 2002, Fourth District staff delivered more than 55 speeches, reaching over 3,000 people. Although the Bank restricted its tour program during the first half of the year, more than 2,000 visitors toured the Cleveland Fed's historic building in 2002.

In the area of economic education, the Bank again sponsored the Fed Challenge competition, in which teams of high school students participate in mock Federal Open Market Committee deliberations. In addition, the Bank launched a new program, "Great Minds Think," which traveled to four cities across the Fourth District. The program—a partnership between the Cleveland Bank, the Ohio Department of Education, the Ohio Center for Economic Education, the Cleveland Public Schools, Jump$tart, and the Foundation for Teaching Economics—highlighted the importance of critical-thinking skills for students and educators and centered on the concept of financial literacy. Nearly 300 students and 118 teachers (who teach 12,000 students annually) attended the workshops. Altogether, participation in District educational programs increased 130 percent in 2002.

The Cleveland Reserve Bank continued to develop plans for a Learning Center, which will foster a better understanding of the Bank's purposes and functions and provide an infrastructure for its educational activities. The centerpiece of the Learning Center will be a permanent Museum of Central Banking. In 2002, the Bank installed a temporary exhibit on "What Gives Money Value?" in the Cleveland Office, and it reviewed proposals to create a permanent exhibit that reflects the Bank's educational visions.

SUPERVISION AND REGULATION

Recent events and legislative changes have had a profound impact on the way bankers and supervisors view corporate governance and risk management in the financial services industry. Changes in the operations and credit quality of the banks and bank holding companies supervised by the Federal Reserve Bank of Cleveland continue to present new challenges and opportunities for the Bank's Supervision and Regulation function. Prominent among these forces are emerging technologies, industry consolidation, changes in the legal environment, and the ever-increasing need for information security.

The Federal Reserve System's approach to supervision is founded on the principles of risk-focused supervision. This approach balances the need to continuously evaluate and assess the effectiveness of enterprisewide risk-management systems with the requirement to conduct adequate transaction testing. The Supervision and Regulation function applies these principles inwardly as well in developing risk-focused supervisors and examiners. Through its Risk Committee, supervision and regulation staff monitor emerging trends in the financial services and legal environment to direct resources to areas of highest risk. Throughout 2002, staff worked to improve their processes for assessing operations risk and corporate governance procedures at Fourth District institutions, as well as the effectiveness of its risk-based examination procedures.

The Bank regards communication, outreach programs, and training for bankers and the public as a fundamental part of its responsibility. In conjunction with the Ohio Division of Financial Institutions, the Bank developed a series of tailored programs to educate the board members and senior management of Fourth District financial institutions. The programs, which deal with topics such as corporate governance, auditing practices, risk management, liquidity, and current legislation, cover timely issues faced by the banking industry and foster more meaningful, open communications with bankers. Supervision and Regulation staff delivered 15 presentations throughout the Fourth District in 2002, and more are planned for 2003.

The Federal Reserve Bank of Cleveland is a strong advocate for fair lending, community economic development, and equal access to credit. To support these goals, the Bank's community affairs staff advised community-based organizations on strengthening their capacity to work with financial services providers and improving affordable housing and microenterprise opportunities in low- and moderate-income communities. The Bank hosted a series of regulatory roundtable discussions on new provisions of the Community Reinvestment Act, and it organized two major conferences, which together reached more than 700 community development practitioners. Additionally, the community affairs function conducted research and published reports on rural economic development, predatory lending, and access to credit and capital in low- and moderate-income communities.

FOURTH DISTRICT OPERATING STATISTICS

	2002		2001	
	Volume	Value	Volume	Value
Commercial checks processed	1,585,299	$ 1,493,551	1,538,948	$ 1,447,973
Currency processed	1,111,922,668	$ 14,539,956,399	1,092,064,249	$ 14,179,668,069
Savings bonds issued	9,981,873	$ 1,787,393,659	9,852,923	$ 1,772,809,623

PAYMENTS SERVICES

The current financial services landscape is characterized by increased competition, rapid change, and technological innovation. As customers demand new, more efficient payment mechanisms and move away from traditional paper-based payments, the Federal Reserve has adapted by developing more sophisticated electronic payments services and by increasing its use of Web-based communications and business processes. Despite these challenges, in 2002 the Federal Reserve Bank of Cleveland continued its tradition of strong performance combined with responsive and innovative solutions to marketplace and customer needs.

Like most of the 12 Reserve Banks, the Cleveland Bank faced significant challenges in the financial performance of its check processing function in 2002. As a result of declining check volumes, unexpectedly low interest rates, and costs associated with the Check Modernization initiative, the Bank fell short of its local net revenue target in this area. However, through a collaborative effort among Bank employees to reduce operating and discretionary expenses, the Bank was able to minimize this shortfall by year-end. Nevertheless, total revenues earned from all of the Bank's financial services exceeded its target by more than $1 million, and the Cleveland Bank continued to rank among the Federal Reserve System's most efficient operations (measured by overall unit cost).

In partnership with the Federal Reserve Bank of Atlanta, the Cleveland Bank's Retail Payments Office continued to manage the System's Check Modernization initiative. This four-part initiative standardizes check processing at all Reserve Bank offices nationwide, implements common software for processing and researching check adjustment cases, creates a national archive and retrieval system for check images, and delivers Web-based check services to customers. Two projects—Enterprise-Wide Adjustments and FedLine® for the Web–Check Services—were completed and fully functional in 2002, and the two remaining projects—Check Standardization and FedImage℠ Services—are poised for a successful finish in 2003.

As part of the Check Modernization Project, several service enhancements were launched in 2002, including a national electronic archive of check adjustments information, large-image file delivery, and a customer gateway for accessing the FedImage Services archive. These innovations provide superior check services to meet the needs of financial institutions across the country. The Retail Payments Office also took a lead role in developing more centralized product and pricing strategies across the Reserve Banks, a reflection of the increasingly national banking environment.

The firm engaged by the Board of Governors for the audits of the individual and combined financial statements of the Reserve Banks for 2002 was PricewaterhouseCoopers LLP (PwC). Fees for these services totaled $1 million. In order 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 Bank 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 2002, the Bank engaged PwC for advisory services totaling $176,600 for services related to the national Check Modernization project. The Bank believes these advisory services do not directly affect the preparation of the financial statements audited by PwC and are not incompatible with the services provided by PwC as an independent auditor.

The Bank implemented two innovative electronic payments services for the U.S. Treasury in 2002. *Pay.gov* uses state-of-the-art technologies to authorize and settle government payments over the Internet; by year-end, the service was serving 14 government agencies and had processed 155,000 ACH and wire transfer transactions totaling $3.6 billion. The *Paper Check Conversion* service, which electronically converts checks presented at the point of sale at government locations worldwide, was serving 25 agencies in 58 locations by the end of 2002, and it processed 163,000 transactions ($78 million). The Cleveland Bank is the System's lead operating site for both initiatives. The Bank's savings bond function is the largest of the five Federal Reserve processing sites as well as the most efficient, evidenced by its lowest unit cost in the System for 2002. In 2002, this function completed the programming phase for a new processing application that will improve the efficiency and flexibility of savings bond processing throughout the Federal Reserve System.

The Fourth District's cash function led the implementation of the Standard Cash Application—which automates cash accounting, control, and reporting functions nationwide—in 11 Federal Reserve System offices. The Cleveland Bank is also home to the application's user support function. The Bank's cash processing function achieved objectives for productivity and quality, operated within budget, and maintained a low unit cost ranking within the System (third-lowest among Reserve Banks).

For a third year, the Cleveland Bank hosted a Payments Symposium, "Using New Technologies to Transform the Future of Payments." During the program, which featured nationally recognized payments industry experts from the U.S. Treasury, the FBI, and the Federal Reserve System, discussion focused on banking industry trends, the evolution of the payments system, and new products and services that are changing the way financial institutions do business. More than 130 Fourth District financial industry presidents and chief executive officers attended the symposium.

QUALITY IMPROVEMENTS

In 2002, the Federal Reserve Bank of Cleveland unveiled a new strategic vision: To create value for customers, stakeholders, and the Federal Reserve System by becoming a recognized leader in the evolution of central banking, the practice of banking supervision, and the development of retail payments systems. This vision will guide the Bank's operations over the next three to five years and provides a common picture of its future.

The Bank continues to employ the balanced scorecard in all functional areas to track performance against objectives. For a second consecutive year, the Bank achieved all key System quality measures and service-level objectives.

The Cleveland Bank seeks to provide efficient and effective solutions to customers and to build valuable business partnerships. In 2002, the Bank worked to ensure a seamless transition to national service provision for its customers. To gauge its progress in meeting customer expectations, the Bank regularly surveys the financial institutions it serves. It exceeded aggressive targets for overall customer satisfaction and customers' perception of the Bank as a valued business partner, as well as the provision of flexible financial services.

In 2002, the Cleveland and St. Louis Reserve Banks joined forces in a business development merger, which combines the two Banks' sales, sales support, product development, and customer communications functions. The partnership, overseen by a regional business development team, will allow each Bank to provide superior customer sales support at a lower cost and with fewer resources while maintaining growth in the financial services industry.

The Bank launched a new public Web site in 2002—*www.clevelandfed.org*—with improved navigation, search tools, and content organization. The design of the site makes it easier for users to locate the latest economic and financial data, research papers and Bank publications, news releases, Bank-sponsored conferences and events, background information about the Cleveland Bank and the Federal Reserve System, and consumer and financial services information.

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Irwin, Pennsylvania

This annual report was prepared by the Corporate Communications and Community Affairs Department and the Research Department of the Federal Reserve Bank of Cleveland.

For additional copies, contact the Corporate Communications and Community Affairs Department, Federal Reserve Bank of Cleveland, P.O. Box 6387, Cleveland, OH 44101, or call 1-800-543-3489 (OH, PA, WV) or 216-579-2001.

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Manager, Communications Support: Patricia DeMaioribus

Editor: Deborah Ring Zorska

Design: Michael Galka

Portrait Photography: Bill Pappas

CLEVELAND
1455 East 6th Street
Cleveland, OH 44114
(216) 579-2000

CINCINNATI
150 East 4th Street
Cincinnati, OH 45202
(513) 721-4787

PITTSBURGH
717 Grant Street
Pittsburgh, PA 15219
(412) 261-7800

COLUMBUS
965 Kingsmill Parkway
Columbus, OH 43229
(614) 846-7494