

## 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.<sup>1</sup>



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

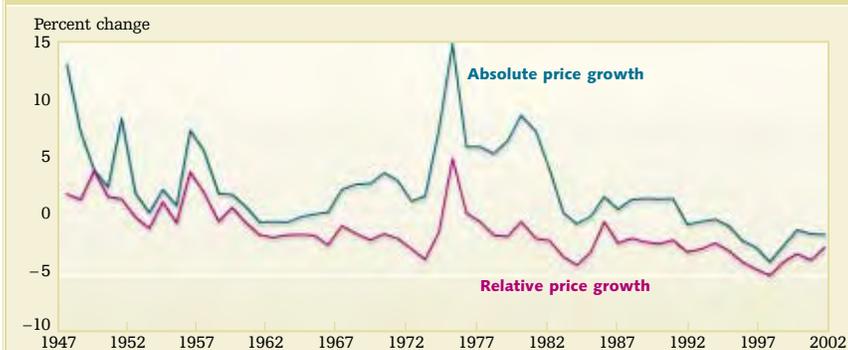
It is important to delineate what we mean by the term “deflation.” Deflation refers to a persistent decline in the *average* of a set of prices. Most of us, of course, don’t observe the average of all prices directly, but rather some (typically small) subset of prices. Price changes in our particular 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.<sup>2</sup> 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.<sup>3</sup>

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.

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.

**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

#### 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).<sup>4</sup> 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.<sup>5</sup>

#### **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.<sup>6</sup> 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.<sup>7</sup>

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.<sup>8</sup> 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.<sup>9</sup>

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.”<sup>10</sup>

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.<sup>11</sup> 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>.