

September 15, 2003

Federal Reserve Bank of Cleveland

What Is the Right Inflation Rate?

by David E. Altig

One of the most striking global policy developments of the past 40 years must surely be the emergence of price stability as the predominant mandated objective—in many cases, the *only* long-run objective—of modern central banks. The list of major countries that have formalized their objectives as explicit inflation targets includes the European Central Bank (ECB) and the central banks of Canada, New Zealand, Sweden, and the United Kingdom. It is no secret that important voices within the Federal Reserve have expressed the desirability of adopting such targets in the United States. (See, for example, Governor Ben Bernanke's speech "A Perspective on Inflation Targeting.")

In those countries that do explicitly announce desired rates of price-level growth, the similarity of the chosen ranges is striking. The target range is currently 1 percent to 3 percent annually for both Canada and New Zealand and 1.5 percent to 2.5 percent in Sweden. The targeted inflation rate in the United Kingdom is 2.5 percent. It is obvious, then, that inflation-targeting central banks are loath to tolerate inflation that is too high and that the operational definition of too high is north of about 3 percent.

Just as notable is the apparent unwillingness to tolerate price-level growth that is too low. Most of the central banks with explicit inflation targets set lower limits that are well above zero. Even those that officially set no lower limit seem to have one in mind. The ECB, for example, does not specify a minimum inflation target, but Otmar Issing, a member of the bank's executive board, has argued that the ECB's objective "was clearly intended from the start to mean *neither* prolonged inflation *nor* prolonged deflation." Issing adds that "the experience and analyses of recent years have shown that ... inflation and interest rate levels

excessively close to zero entail risks of deflation and reduce the scope for monetary policy action."¹

Few doubt that central bankers in the United States share much of the sentiment that is formalized among inflation-targeting central banks. Since the last significant break in the U.S. inflation trend in the early part of the past decade, annual CPI inflation rates have not been allowed to exceed 3.5 percent. On the other hand, it is just as clear that there are limits to how far Fed policymakers are willing to go in reducing the average pace of price-level growth. Recent speeches by Bernanke and Federal Reserve Bank of Richmond President Al Broadus are testimonials to an aversion by Federal Open Market Committee members to declining price levels. The consensus across the world's major central banks, then, seems to be that inflation ought to be low, but not too low.

Why is the "right" inflation rate low, but not too low? In this *Economic Commentary* I review some empirical evidence and sketch some economic theory that together provide a potential answer to this question. The analysis I present is based on the work of our late friend and colleague Bruce D. Smith.

To be sure, there are answers to the question of what the right inflation target should be that I will not cover in this short article. On the not-too-high end of the spectrum, some economists, such as Harvard's Martin Feldstein, have emphasized interactions with nominally based capital-income taxation. On the not-too-low end, many economists note that measurement problems may result in calculated inflation rates overstating the true rates. In most cases, these arguments, and others, complement the theory and evidence I will discuss here. But the work of Bruce and his coauthors has the distinct advantage of describing the

The primary objective of most of the world's central banks these days is to keep inflation low, and the range of inflation rates banks find acceptable appears to be around 2.5 percent to 3.5 percent. While banks may have hit on this range through trial and error, economic theory and empirical observations suggest a good reason for it.

desire to avoid both high and very low inflation (or deflation) out of a common story about how the economy works.

■ Why Low Inflation? Some Usual Suspects

Why has the behavior of central banks—and the social consensus that supports that behavior—converged on the apparent belief that average rates of inflation should not exceed the lower half of single digits? The classic view is that inflation is bad because it wastes resources, and therefore low inflation is better than high. Economic textbooks often list three problems associated with inflation: hyperinflation, uncertainty, and so-called "shoe-leather" costs. But does the desire to avoid these costly problems convincingly explain the acceptable range of inflation modern central banks have settled on?

The costs of hyperinflation seem obvious, but appeals to hyperinflationary episodes are hardly informative about the choice between moderate inflation—say annual rates in the 10–15 percent range—and the quite low rates favored by today's central bankers. Similarly, it isn't hard to understand the problems that can arise with volatile and unpredictable price-level fluctuations, but that doesn't explain why anticipated inflation is of any concern. (Although it is well known that the level and variability of

inflation are highly correlated, the explanations as to the source of this connection are seldom offered.)

That leaves shoe-leather costs, the resources that are employed to minimize money balances in an inflationary environment (and hence minimize the costs of declines in the purchasing power of money). These costs, of course, should be interpreted broadly, including, for example, the vast resources that corporations devote to financial management. But surely difficulties with cash management cannot begin to explain why a policymaker would prefer, say, 2½ percent inflation to a perfectly predictable pace of 10 percent.

■ Why Low Inflation? Another Case

An empirical case for preferring 2½ percent price-level growth to an average rate near 10 percent can be supported by two key observations. First, the existence of a well-developed and smoothly operating process of financial intermediation is a key contributor to economic growth, and second, high inflation interferes with intermediation.

The term “financial intermediation” just describes the function of getting resources from the pockets of savers into the hands of borrowers, such as firms and entrepreneurs. To observe that financial intermediation is a key to growth is to say that countries with a robust banking system, broad equity markets, and deep capital markets are on average more prosperous than countries without.

It is possible, of course, that the association between financial intermediation and economic growth merely reflects the fact that financial market activity is naturally larger in economies with more economic activity. But careful statistical analysis suggests that the causation works both ways; while higher GDP growth does drive financial intermediation, financial intermediation, at least in part, drives output growth, too.

The second key observation, that high inflation interferes with the process of financial intermediation, is illustrated in figure 1. Figure 1 plots, for a variety of countries over the period from 1960 to 1995, a measure of average financial market activity—the sum of lending to the private sector and equity market capitalization to be precise—against

annual average inflation rates. The relationship, as the chart indicates, is negative, indicating that higher rates of inflation are associated with lower levels of financial market activity.

Why think high inflation is responsible for the low level of financial market performance? The theoretical basis for believing so centers on the proposition that high inflation rates result in low returns to capital and hence diminished incentives to save and invest. The problem is particularly acute when collateral is required for the efficient functioning of borrowing and lending markets. Too little saving inhibits the accumulation of collateral, thereby inhibiting growth-enhancing financial intermediation. (See “Taking Financial Intermediation Seriously” for a detailed exposition, that is, a tractable mathematical model, of the theory.)

How high is too high? Careful analysis of evidence like that shown in figure 1 suggests that, for developed countries, that answer is less than 5 percent. In other words, the empirical ceiling above which inflation appears to be harmful to economic performance is about equal to the upper bound chosen by inflation-targeting central banks, plus a few percentage points for cushion.

■ Why Not Too Low?

This, of course, leaves the second aspect of central bank behavior yet unexplained. If less than 5 percent is suitable for maximum sustainable growth, why not go all the way to zero? Why not negative rates of inflation? Why do central banks that seek to avoid even moderately high rates of inflation also appear reluctant to engineer rates of inflation that are too low?

The casual answer to this question is that deflation is a bad thing, and the lower the rate of inflation, the more likely it is that the economy may spend extended periods of time in periods of falling prices. But this can only be part of the answer. Indeed, it is far from obvious that deflation per se is problematic. (See the Federal Reserve Bank of Cleveland’s *2002 Annual Report*.)

A comparison of China and Japan over the second half of the 1990s and into the turn of the millennium offers an instructive example. As appears clear from glancing at figure 2, the inflation experiences of the two countries over this period are remarkably similar. In fact, from 1997 through 2002, the average inflation rate for consumer prices in both

Japan and China was, for practical purposes, zero (slightly positive in China, slightly negative in Japan.)

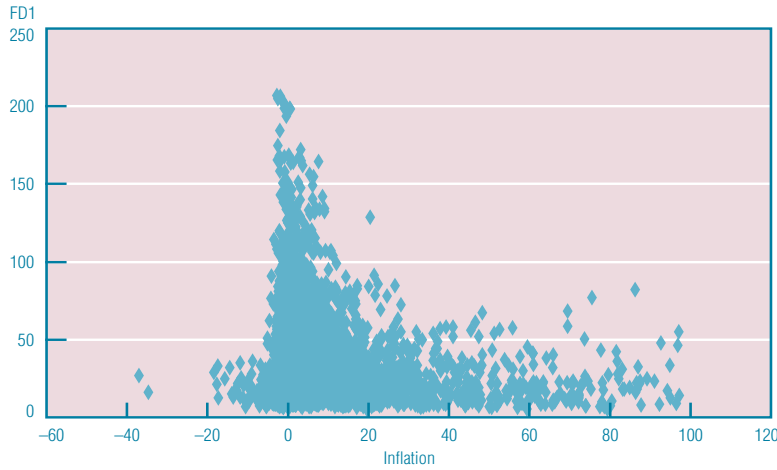
The growth performances of GDP, on the other hand, were as different as the inflation rates were similar. Over the period extending through 2000 (the latest for which we have final Chinese data), the Japanese economy grew at an average rate of under 1 percent. The Chinese economy, in contrast, grew by nearly 8 percent per year. So here is an example of two economies, with very low average inflation rates, both experiencing periodic deflations. And yet one struggles while the other thrives. What distinguishes one from the other?

A clue can be found in the real returns to capital in each country. Figure 3 shows real interest rates for the two countries, again from 1997 through 2002. Here the comparisons mirror the GDP growth differences. Real, inflation-adjusted returns over the period are fairly high in China—between 5 percent and 10 percent—and quite low in Japan—ranging from zero to about 3 percent.

It is in low real interest rate environments—typical of mature, highly capitalized economies like Japan (especially in downturns or slow growth periods)—that deflation is most likely to be problematic. There are two views on why this might be so. In the first, most conventional view, the capacity of monetary policy to stimulate the economy requires the ability to lower short-term interest rates as a way to influence the whole spectrum of rates that determine spending on goods and services. Once short-term nominal interest rates fall all the way to zero, so the story goes, this specific channel of policy influence becomes tenuous (because nominal interest rates cannot, in normal circumstances, be driven into negative territory). In this case, low inflation rates are problematic if they make it more likely that the zero bound on interest rates will be hit. (On this problem, however, see Bernanke’s comments in his “Deflation...” speech.)

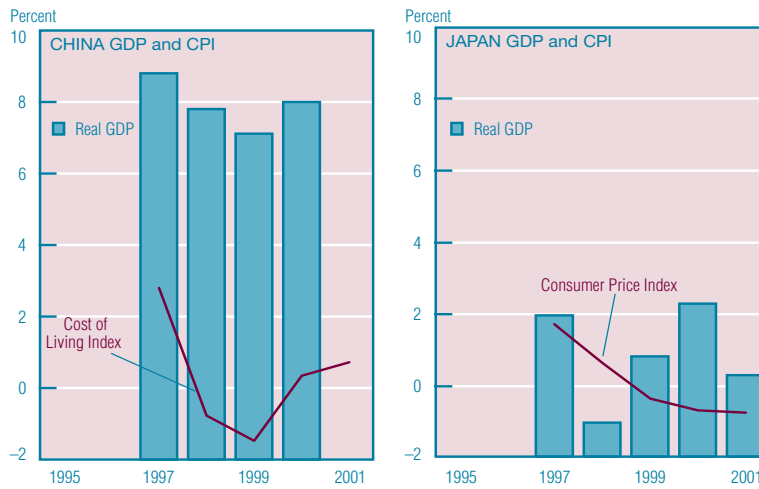
A less familiar, but perhaps more troubling view builds on the connection between growth and financial market activity, discussed above as a justification for avoiding inflation rates that are too high. In this view, low nominal interest rates weaken the incentives of banks, for example, to lend. In the absence of active participation by financial institutions in the process of chan-

FIGURE 1 FINANCIAL DEPTH AND INFLATION



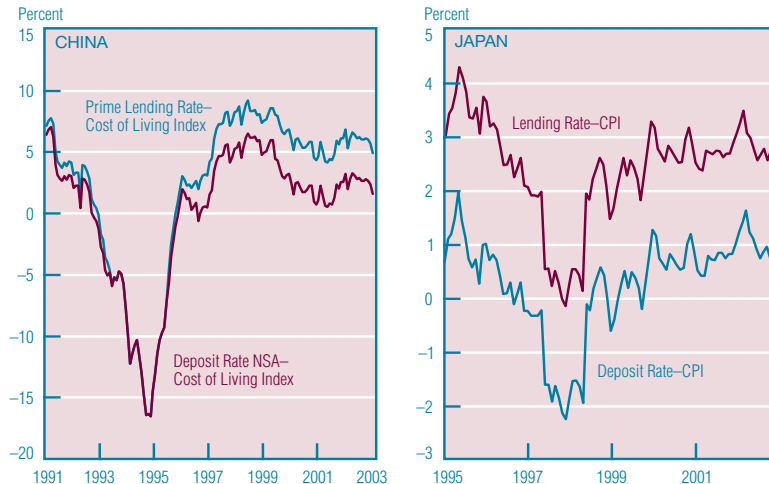
NOTE: FD1 is the sum of lending to the private sector and equity market capitalization for each of the countries included.
 SOURCE: "Inflation and Financial Depth," by Mohsin S. Khan, Abdelhak S. Senhadji, and Bruce D. Smith, International Monetary Fund Institute, Working Paper 0144, and "A New Database on Financial Development and Structure," by Thorsten Beck, Asli Demirguc-Kunt, and Ross Levine, unpublished manuscript (data provided by the authors).

FIGURE 2 GROWTH AND INFLATION IN CHINA AND JAPAN



SOURCE: International Monetary Fund, International Financial Statistics.

FIGURE 3 REAL INTEREST RATES IN CHINA AND JAPAN



SOURCE: International Monetary Fund, International Financial Statistics.

neling funds to borrowers, the capacity of the economy to expand can be hindered, perhaps severely.

This idea is really just a variant of a famous result in monetary macroeconomics known as the Mundell-Tobin effect. Named for Robert Mundell and James Tobin, the two Nobel Prize winners credited with the idea, the Mundell-Tobin effect derives from the notion that money should be thought of as an alternative asset to claims on physical capital. The implication for the present discussion is that, over some range, the return to capital may be so low that the incentives of banks and other financial intermediaries to lend, rather than simply accumulate "cash," becomes negligible. Such a circumstance is most likely when price-level growth is low or negative, because the return to money rises as the pace of inflation falls.

This view of the potential dangers of low inflation carries with it two critical policy implications. First, problems may arise well before nominal interest rates actually hit zero—the interest rate that is too low is the one at which financial intermediation stalls—and (if real interest rates are low enough) well before inflation rates actually enter negative territory. Second, strategies such as targeting long-term interest rates if short-term rates fall to zero, or close to it, will be counterproductive unless they result in an increase in expected inflation, and hence nominal interest rates, to levels high enough to prompt the reemergence of financial market lending.

Empirical evidence does in fact suggest that, at very low rates of inflation, a little higher price-level growth may be preferable to a little lower. Specifically, looking over a cross-section of countries that includes those with both high and low rates of price-level growth, there appears to be a *positive* association between growth and inflation, as long as the rate does not move beyond the 5 percent threshold associated with deteriorating long-term growth.

■ **Institutional Wisdom?**

The proposition that high rates of inflation are detrimental to long-run economic performance is no longer a matter of serious dispute. It is simply not possible to contemplate global macroeconomic history over the past 40 years without concluding that central bankers have converged on the belief that average annual price-level growth ought not exceed a lower single-digit pace. The success enjoyed in containing inflation to these levels would make it inevitable that the question of whether inflation can be too low would eventually come to the table. It has, and the behavior of central

bankers the world over seems to speak to the conclusion that the answer is it can.

On the basis of observing central bank decisionmaking today, the dominant definition among monetary policymakers of the “right” inflation goal seems to be somewhere between 1 percent and 4 percent. To be sure, the book on this subject is far from closed. But as we confront this conclusion with economic theory and real-world evidence, the sense of today’s central bankers looks more and more like wisdom.

■ Recommended Reading

Ben S. Bernanke, 2003, “A Perspective on Inflation Targeting,” speech delivered at the Annual Washington Policy Conference of the National Association of Business Economists, Washington, D.C., March 25. Available at www.federalreserve.gov/boarddocs/speeches/2003/20030325/default.htm.

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Bruce D. Smith, forthcoming, “Taking Financial Intermediation Seriously,” *Journal of Money, Credit, and Banking*.

On credit market imperfections:
O. Emre Ergungor and Joseph G. Haubrich, 2003, “Information and Prices,” Federal Reserve Bank of Cleveland, *Economic Commentary*, May 1.

■ Footnotes

1. “ECB Watchers Conference: Monetary Policy and the Role of the Price Stability Definition,” www.ecb.int/key/02/sp020610.htm.

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