

PRICE STABILITY: THE POLICY AND RESEARCH PERSPECTIVES

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Efficient utilization of any nation's resources requires a sound and predictable monetary policy by its central bank. Price stability should be placed above other economic goals that the Federal Reserve is responsible for achieving, because it is the most important contribution the Federal Reserve can make to achieve full employment and maximum sustainable growth.

To us, at the Federal Reserve Bank of Cleveland, the pursuit of price stability makes good sense, practically as well as theoretically. As such, this paper is divided into two major parts. The first part will discuss price-level stability — more popularly known as zero inflation - from the standpoint of monetary policymaking. We think that the Federal Open Market Committee (FOMC) cannot and should not continue to entertain the notion that monetary policy can be used to fine tune the economy. To attain optimal long run growth, monetary policy ought to declare and pursue the one objective under its control — price stability. The second part of the paper will discuss economists' criticisms of a price stability policy, and our reactions to these criticisms.

THE BENEFITS OF PRICE STABILITY

An important benefit of price stability is that it would stabilize the economy. High and variable inflation has always been one of the prime causes of financial crises and economic recessions. Certainly U.S. experience since World War II reaffirms the notion that inflation is a leading cause of recessions. Almost every recession in our recent history has been preceded by an outburst of cost and price pressures and the associated imbalances and distortions. A monetary policy that strives for price stability, or zero inflation, would help markets avoid distortions and imbalances, stabilize the business cycle, and promote the highest sustainable growth in our economy.

A market economy achieves maximum production and growth by allowing market prices to allocate resources. Money helps make markets work more efficiently by reducing information and transactions costs, allowing for better decisions and improved productivity. Stabilizing the price level would make the monetary system operate more efficiently and would result in a higher standard of living for all Americans. Much of our society's wealth consists of claims denominated in, and payable in, dollars. Thus, dollar denominated assets represents a claim on a share of society's output. Stabilizing the price level protects the value of that claim, while inflation reduces it.

Borrowers promise to pay back the amount borrowed with interest. When unpredictable inflation is permitted, wealth is arbitrarily taken away from the lender and given to the borrower. If this condition persists, then an environment is created in which interest rates rise once to accommodate expected inflation and rise again to accommodate the increased risk associated with an uncertain inflation. When inflation rises and becomes uncertain, people are forced to develop elaborate, complicated, and expensive mechanisms to protect their wealth and income, such as new accounting systems, markets for trading financial futures and options, and cash managers who spend all their time trying to keep cash balances near zero. It is inefficient to allow inflation to change the yardstick we use to measure economic value.

While the evidence that price stability maximizes production and employment is not conclusive, it is persuasive. One source of evidence can be found in the comparison of inflation and real growth across countries. A number of studies find that higher inflation or higher uncertainty about inflation is associated with lower real growth.¹ Inflation adds risk to decisionmaking and retards long-term investments. As mentioned, inflation causes people to invest scarce resources in activities that have the sole purpose of hedging against inflation. Also, inflation interacts with the tax structure to stifle investment incentives.

More evidence comes from the extreme cases of hyperinflation. In states of rapid inflation, economic performance clearly deteriorates. Both specialization and trade decline as small firms go bankrupt and people return to home production for a larger share of goods and services.

Even a relatively predictable and moderate rate of inflation can be quite harmful. During the seven years of economic expansion in the 1980s, the purchasing power of the dollar was reduced by about 25 percent. Interest rates continued to include a premium for expected inflation and a premium for uncertainty about inflation.

Inflation is costly when it interacts with the tax system. Bracket creep, the process by which inflation pushes individuals into higher tax brackets, has plagued the system ever since the first progressive income tax was introduced. While indexation of the personal income tax code partially adjusts for bracket creep, there remains a lag. A recent study estimates that the welfare cost of these interactions is equivalent to a wealth loss of about \$1,900 per capita (1989 dollars) than would be the case with perfect indexing (zero inflation) [Altig and Carlstrom, forthcoming]. However, the most significant cost of the current system is due to the taxation of nominal interest income. This same study finds that the distortion from a perfectly anticipated 4 percent rate of inflation reduces welfare by the equivalent of nearly \$14,250 per person.

Even beyond these costs, inflation diminishes productivity growth. Because the worldwide slowdown in productivity growth occurred simultaneously with the acceleration in inflation and oil price shocks, the evidence is very difficult to sort out satisfactorily. However, the present value of lost output from even a very small reduction in the trend of productivity growth would far exceed the adjustment costs associated with the transition to price stability.

ARGUMENTS AGAINST A MONETARY POLICY OF ZERO INFLATION

A commitment by Congress and the Federal Reserve to achieve price stability would most likely entail some adjustment costs. Adjustment costs would arise from two sources: contractual obligations and the credibility problem, or uncertainty about whether

price stability would be achieved and maintained. The contractual costs can be alleviated with an appropriate adjustment period.

Much of day-to-day economic activity is conducted under contracts and commitments that extend over longer periods of time and that embody the expectations of a continuing moderate inflation rate. Most of these contracts will expire in the next few years. The disruption to business and the arbitrary wealth redistribution of an abrupt adjustment to price stability would be greatly reduced by an appropriate phase-in period. House Joint Resolution 24 (H.J. Res. 24), introduced to Congress by Representative Stephen Neal (D-NC), mandates the Federal Reserve to eliminate inflation over a five year period. Five years is a period long enough to substantially reduce the adjustment costs.

The second set of adjustment costs emanates from the expectations of economic agents. Economists have not made enough progress in estimating the transition costs of eliminating inflation. Frequently, econometric models that embody a large number of complex relationships and variables are used to estimate the adjustment costs. For manageability, econometric models are built with many simplifying assumptions, one of which is the presumption that economic agents are backward-looking in the way they form and change expectations. In these models, expectations, which in effect determine adjustment costs, are formed from past experience and change only slowly as the future unfolds.

The presumption that expectations change slowly inevitably generates estimates of high transition costs. The real question about a change in monetary policy to zero inflation is how forward-looking economic agents would behave under a fully credible and fully understood policy change. Backward-looking models are relatively useless in answering this question. In almost every case, such models are constructed to display the effects that are consistent with the model builder's theories and biases. Almost all of the large models are based on the dual notion that the only way to eliminate inflation is to raise the unemployment rate. Naturally, these models will find that eliminating inflation is very costly. These exercises have been conducted many times in the past, and they have consistently overestimated the costs of eliminating inflation and ignored the benefits of doing so. It can also be observed that those who really believe the analytical structures contained in these models should advocate an acceleration of inflation because the models would predict great benefits from doing so.

As the Congressional Budget Office points out in a recent Economic and Budget Outlook, if everyone believed that inflation would be reduced to zero, and planned accordingly, these costs would be very low. As the CBO study states, "...inflation could be reduced relatively painlessly by lowering inflationary expectations" [U.S.C.B.O., 1990, 25]. A commitment by the Congress and the Federal Reserve would enhance credibility and convince economic agents to begin to base decisions on the assumption of gradual elimination of inflation over a five-year period.

The Federal Reserve has stated that it intends to reduce inflation to zero or to low levels, but it has not committed to a specific timetable for eliminating inflation, or to a plan for doing so. The result is that the public in general and the markets in particular wonder just how serious the Fed is in those intentions, or whether we will switch our priorities to some other goal, as we have in the past. A firm commitment to price stability would be provided by legislation such as H.J. Res. 24.

One member of the Council of Economic Advisers, an expert on such matters, has developed large econometric models with sluggish resource adjustment induced by labor contracts [Taylor, 1980; 1983]. Even in these models, there is almost no short-run cost to

eliminating inflation with a credible policy change. The reason is simply that, in these models people are assumed to change their behavior in response to the policy change.

A consistent commitment to a long-run policy goal of price stability is important. One of the worst things that policymakers could do is eliminate inflation for a while and then return to high inflation later. A monetary policy of price stability would focus the policy process on consistent long-run goals and away from reactions to each new report of economic activity. Each policy action would become part of a policy process that is consistent with long-run price stability.

ECONOMISTS' ZERO INFLATION DEBATE

Our advocacy of price stability stems from three deeply held beliefs. The first is that a central bank can, over time, control the price level of goods and services denominated in its own currency, but it cannot control the growth of output (potential or actual). The second is that a credible commitment to an inflation objective enables a central bank to promote economic efficiency and growth (potential and actual). The third belief is that price-level stability, or zero inflation, is superior to inflation-rate stability.

Among economists, support for the first assertion is nearly universal. There is also widespread agreement on the second point. It is the last proposition that is most contentious, particularly when people attempt to compare the costs of achieving zero inflation to the costs of stabilizing the inflation rate at the status quo. A good representation of criticisms against zero inflation is found in an article entitled "Deflating the Case for Zero Inflation." The Essay by Rao Aiyagari [1990] is well written and summarizes some common opinions about the costs and benefits of stabilizing the price level. The author has performed a valuable service by reviewing a portion of the relevant literature on this subject and, through referencing his work, responding to the criticisms of many others.

Aiyagari concludes that the benefits of zero inflation are small compared to the costs of getting there, and that most of the costs associated with nonzero average rates of inflation can be adequately addressed by adopting institutional changes that do not require specific inflation targets. These conclusions are unwarranted. Moreover, Aiyagari's article raises concerns that, if it is not read carefully, could give the false impression that economists have already decided that the costs of achieving price stability exceed the benefits that would result.

There are two dimensions to critics' argument that the cost of pursuing a zero-inflation target would outweigh the benefit of reaching that target. The first is that the advantages of achieving zero inflation would be small. The second deals with the costs of moving from a five percent trend rate of inflation to a zero-inflation world. This is the transition-cost argument, which essentially says that even if zero is the place to be, getting there is not worth the ride.

In an effort to better understand the issue, the Federal Reserve Bank of Cleveland recently held a conference that brought together several economists to examine the state of the art in this area [Gavin, 1991]. Participants presented analyses of the optimal rate of inflation under a variety of assumptions about the tax environment. Some addressed the optimal inflation issue explicitly, some only implicitly.

Based on the papers presented, it is fair to say that the economics profession has yet to deliver a compelling theoretical treatment of the optimal rate of inflation that deserves to be embraced as the new conventional wisdom. This is not particularly surprising.

Economic understanding progresses through intellectual competition among alternative, stylized models. Often, it takes a great deal of time before these models yield results that are immediately useful for policy analysis.

INFLATION AND TAXATION

One *friction* that economists often take into account when considering how society might benefit from zero inflation is the role of the tax system. An early contribution to the optimal inflation literature was written by Milton Friedman [1969], who presented an analysis showing that the optimal inflation rate is negative (equal to minus the real interest rate). Edmund Phelps [1973] modified Friedman's analysis and argued that if the government had only welfare-distorting taxes at its disposal, then the optimal inflation rate might be positive after all. The intuition for this result is straightforward: The optimal inflation tax should be such that the marginal welfare cost of revenue raised by inflation equals the marginal welfare cost of revenue raised from other sources.

The Friedman and Phelps analyses of inflation as part of an optimal taxation system sparked a literature that is still flourishing today. For example, a paper presented by Thomas Cooley and Gary Hansen [1991] at the Federal Reserve Bank of Cleveland's price stability conference concludes that the inflation tax is less burdensome than either capital or labor taxes. But their results are based on the peculiar assumption that the effective capital tax rate at five percent inflation does not change when the inflation rate becomes zero. This is an assumption that surely underestimates inflation's deleterious effect on the capital stock. Another presentation at the conference, by V. V. Chari, Lawrence Christiano, and Patrick Kehoe [1991], shows that the Friedman rule holds even in the presence of distorting taxes; in other words, the best monetary policy yields an inflation rate equal to minus the real rate of interest. In their model, the optimal inflation rate has a large variance around its trend (about twenty percent) because it is desirable for the government to use its fixed nominal debt, in conjunction with variable inflation, to generate changes in the real burden of its debt over the business cycle.

Another conference participant, Lawrence Summers [1991], predicts that the optimal taxation literature will teach nothing useful about the optimal inflation rate. He argues that seignorage is simply not an important revenue source, and that the public cares about inflation for other reasons.²

The interaction between inflation and our current tax system, especially as it applies to income generated by capital, represents one of the more significant channels through which nonzero inflation can exact economic costs. This channel of distortion is often not taken seriously because people think that its effects are minimal or that it would be easy to index the tax system. For example, Aiyagari claims that the superior solution would be a change in the tax system, not a change in our monetary policy goals. Correcting the tax code is a good idea, of course, but until that happens, what possible excuse is there for not letting the monetary authorities do what is necessary to improve social welfare?

It is clear that our horrendous inflationary experiences in the 1970s and early 1980s induced the limited inflation indexation of the current tax system. However, the job is far from complete. Capital gains, corporate depreciation and interest expenses, and personal interest income remain untouched by efforts to index the tax system for inflation. Complete indexation of the tax code, however desirable it may be, will be extremely difficult to achieve. As mentioned, even the bracket indexation implemented by recent

tax reform does not fully protect taxpayers from *bracket creep* (nonlegislated increases in marginal tax rates created by positive inflation).

Will another inflationary experience like that of the 1970s be required to induce further progress on tax indexation? To ask this question is to presume that the onus of responsibility should be placed solely on Congress. The problem exists because of the interactions between inflation and a tax system based in current dollars. Therefore, the responsibility for minimizing these costs lies as much with the monetary authority as with Congress. From a policy perspective, it makes good sense for the monetary authority to try to correct the inflation part of the problem, rather than to hope that Congress will implement changes that it may be unable or unwilling to pursue.

DRIFTING IN UNCERTAIN WATERS

Another area of concern is the role of uncertainty as a source of inflation costs. How important are the price system distortions that arise from uncertain inflation? There is a class of models — the market-clearing, imperfect-information paradigm associated with Robert Lucas and others — in which inflation uncertainty harms the economy by distorting the period-to-period relative price signals that facilitate the efficient allocation of scarce resources [Lucas, 1972].

Despite the pervasive intellectual influence exerted by the Lucas framework to this day, the empirical evidence accumulated since the development of the paradigm in the early 1970s has not been entirely supportive. This point is not lost on critics, who think that the lack of evidence on short-term distortions should be adequate proof that inflation uncertainty is simply not that important to social welfare.

But surely the relative-price/aggregate-price confusion stressed by the Lucas-type models is a special type of uncertainty. The failure to find significant effects arising from uncertainty that is resolved over the period of a few quarters tells us next to nothing about the type of long-run uncertainty with which the zero-inflation position has always been fundamentally concerned. Indeed, Laurence Ball and Stephen Cecchetti [1990] demonstrate that it is precisely the uncertainty occurring over extended time horizons that is most affected by the average inflation rate. To us, this is a compelling reason to favor a price-level target. An inflation-rate target enables the price level to drift without bound, and with no enforcement mechanism to ensure that inflation *mistakes* will be corrected, the long-run variance of the price level is infinite.

Concern about this longer-term uncertainty is essentially what Lawrence Summers stressed at the November conference. From his viewpoint, inflation is important because money is an intertemporal standard of value. When people have reason to believe that this standard will erode over time, they invest numerous resources to protect themselves. Those who have nominal debt outstanding will drag their feet in paying it back, while creditors will invest in ways to accelerate the collection of funds. The private gains to self-protection are clear, as are the social costs.

Recent experience is the best testimony to the real resource cost of inflation. During the 1970s, people could see that inflation accelerated with each passing year. They guessed, reasonably at the time, that financial assets were of limited value in protecting their wealth from the inflation tax. Consequently, farm land, commercial and residential property, and precious metals became much more expensive as people sought to shelter their wealth. Not only was time spent seeking out these investments, which was socially

wasteful, but the resource misallocation itself resulted in a much greater waste of land, labor, and capital that society is still paying for today.

It is difficult to comprehend how efficient planning within the public and private sectors could not be inhibited by this type of long-run uncertainty. Furthermore, the intuition that long-run inflation uncertainty is costly has empirical support: In cross-country comparisons, the variability of inflation tends to be negatively related to economic growth [Grier and Tullock, 1989; Friedman, 1969]. We find that the case for reducing price level uncertainty is far more compelling than a cursory analysis might indicate.

TRANSITION COSTS

Typically, the economic models used to do optimal inflation analysis have few, if any, real-world frictions. Markets are assumed to clear continuously and costlessly, information is free, and expectations — if they play any role at all — are rational. Money has few effects on the real economy in such a world, and so it is not surprising that the benefits of zero inflation in this scenario are small. People merely plan on the nominal values of transactions changing predictably over time. If money doesn't matter much for the performance of the nonfinancial economy, then what the monetary authorities do to money is of little importance.

In evaluating the costs of getting to zero inflation, economists almost always use models in which markets do not clear, or do not clear without cost. Gone is the market-clearing, flexible price, rational expectations model. In its place is a model with price contracts that make the transition to zero extremely costly. The source of the friction is usually not entirely explicit, but the implication is that we must assume some frictions. It is these frictions, coupled with the inability of markets to clear, that make ending inflation so costly.

But isn't it sensible to assume that the implicit sources of frictions that make lowering the inflation rate costly would also contribute to making inflation costly in and of itself? For instance, a variety of explicit and implicit nominal contracts already exist among people, and a transition to zero inflation could alter the real values of payments from those originally intended. But surely the entire institutional apparatus that generates these contracts must involve resource costs that are positively related to the average rate of inflation.

One should not compare the costs of getting to zero inflation in non-market-clearing models, where such costs are high, to the benefits of being at zero inflation in frictionless, continuously clearing models, where the benefits are low. If we are going to use a model with frictions to measure the cost of getting to zero inflation, then we should also use such a model to examine the benefits of being there. This is one reason to be skeptical of so many "cost-benefit" estimates of reducing inflation, including Aiyagari's.

Another reason to be skeptical about transition cost estimates is that they do not account for the possibility that a price stability objective will be regarded as credible by the public. Economic theory and reasonable model simulations indicate that with credible precommitment, a central bank can greatly minimize private-sector planning errors during the transition period. Much of the disagreement among economists on the size of transition costs revolves around the ability of a central bank to credibly commit itself to achieving its objective.

CONCLUSION

History suggests that economic performance is not very good in countries that try to deal with inflation through government indexation of the tax code, transfer payments, bank accounts, and other nominal transactions. At the same time, private contracting arrangements in these and other countries seem never to go far enough in protecting people, presumably because of the costs associated with implementing and maintaining the process. People do not like inflation, and when it becomes high enough for long enough, they demand that it end. From a political point of view, perhaps a five percent inflation rate could be tolerated forever in the United States. Not long ago, however, this nation resorted to wage and price controls to combat an inflation rate of four percent.

Economists must think about inflation scientifically. They should want to know how inflation, even at five percent, affects resource allocation and social welfare. This is the spirit in which Rao Aiyagari frames his analysis. Economists are just beginning to undertake the truly hard work of modeling the effects of inflation on economic welfare, and what little is known about these effects only indicates just how much more work lies ahead. One direction that seems particularly worth pursuing is modeling the resource costs of coping with the intertemporal uncertainty about the value of money.

As research on inflation matures, monetary policy will be guided by the results. Before that time, monetary policymakers must rely on evidence provided by the current body of research; specifically, that inflation is the one economic variable that the monetary authority can control in the long run and that low inflation countries experience the most rapid long run economic growth.

NOTES

1. See the empirical study of long-run growth rates in 47 countries by R. Kormendi and P. G. Meguire [1985]. Theoretical models that reach these conclusions include R. J. Barro [1980], A. Mascaro and A. H. Meltzer [1983], and A. C. Stockman [1981].
2. LeBow, Roberts, and Stockton [1990] make the same point.

REFERENCES

- Aiyagari, S. R. Deflating the Case for Zero Inflation. *Federal Reserve Bank of Minneapolis Quarterly Review*, Summer 1990, 2-11.
- Altig, D. and Carlstrom, C. T. Bracket Creep in the Age of Indexing: Have We Solved the Problem? *Federal Reserve Bank of Cleveland Working Paper 9108*, forthcoming.
- Ball, L. and Cecchetti, S. G. Inflation and Uncertainty at Long and Short Horizons. *Brookings Papers on Economic Activity*, 1990, 215-254.
- Barro, R. J. A Capital Market in an Equilibrium Business Cycle Model. *Econometrica*, September 1980, 1393-1417.
- Chari, V.V., Christiano, L. J., and Kehoe, P. J. Optimal Fiscal and Monetary Policy. *Journal of Money, Credit and Banking*, August 1991, Part 2.
- Cooley, T. F., and Hansen, G. D. The Welfare Costs of Moderate Inflation. *Journal of Money, Credit and Banking*, August 1991, Part 2.

- Friedman, M. *The Optimum Quantity of Money and Other Essays*. Chicago: Aldine Publishing Co., 1969.
- Gavin, W. T., ed. Price Stability. *Journal of Money, Credit and Banking*, 1991, Part 2.
- Grier K. B. and Tullock, G. An Empirical Analysis of Cross-National Economic Growth, 1951-80. *Journal of Monetary Economics*, September 1989, 259-276.
- Kormendi R. and Meguire, P. G. Macroeconomic Determinants of Growth: Cross-Country Evidence. *Journal of Monetary Economics*, September 1985, 141-63.
- Lebow, D. E., Roberts, J. M., and Stockton, D. J. Economic Performance under Price Stability, unpublished manuscript, Board of Governors of the Federal Reserve System, December 1990.
- Lucas, R. E. Jr. Expectations and the Neutrality of Money. *Journal of Economic Theory*, April 1972, 103-24.
- Mascaro A. and Meltzer, A. H. Long and Short-term Interest Rates in a Risky World. *Journal of Monetary Economics*, November 1983, 485-518.
- Phelps, E. S. Inflation in the Theory of Public Finance. *Swedish Journal of Economics*, March 1973, 67-82.
- Stockman, A. C. Anticipated Inflation and the Capital Stock in a Cash-in-Advance Economy. *Journal of Monetary Economics*, November 1981, 387-93.
- Summers, L. H. How Should Long-Term Monetary Policy Be Determined? *Journal of Money, Credit and Banking*, August 1991, Part 2.
- Taylor, J. Aggregate Dynamics and Staggered Contracts. *Journal of Political Economy*, February 1980, 1-23.
- _____. Union Wage Settlements During a Disinflation. *American Economic Review*, December 1983, 981-993.
- U.S. Congressional Budget Office. *The Economic and Budget Outlook: Fiscal Years 1991-1995*. Washington: U.S. Government Printing Office, January 1990, 25.