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Introduction

Christina D. Romer and David H. Romer

In recent years, a consensus has emerged among economists and central bankers that low inflation should be the key goal of monetary policy. In the 1980s and early 1990s, country after country endured depressed output and high unemployment to reduce its rate of inflation. Despite this consensus and concerted action, however, the economic rationale and policy implications of low inflation are only partly understood. For example, while there is ample evidence that high inflation harms economic growth and stability, there is remarkably little research on the costs and benefits of reducing inflation from, say, 3% to 1%. Similarly, there is little research on the least disruptive way to reduce inflation.

This volume, which grew out of a conference held in Islamorada, Florida, in January 1996, seeks to fill this gap in our understanding of low inflation. In a series of related but independent papers, sixteen distinguished economists analyze the appropriateness of low inflation as a goal for monetary policy and discuss possible strategies for reducing inflation. In considering the strategies for reducing inflation, the authors analyze both day-to-day issues in the conduct of monetary policy and fundamental reforms of monetary institutions.

Perhaps the most unusual feature of this collection of papers is the wide range of data and analytical techniques that they employ. One paper analyzes an original survey to detect attitudes toward inflation; another uses detailed panel data to investigate the effects of inflation on the wages of individual workers. Several papers use narrative evidence on historical episodes to analyze the successes and failures of monetary policies in the past, while others rely on sophisticated econometric analysis of macroeconomic indicators. An-

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other paper puts together a detailed data set to analyze differences in institutions and inflation across countries. And one paper even employs the novel approach of searching for key words in the *Wall Street Journal*.

While the methods of analysis differ greatly across the papers, two things unite them. Most obviously, all of the papers seek to answer important questions about the wisdom and methods of reducing inflation. More subtly, each paper mixes frontier economic research with concern about pressing policy issues. This is truly a volume that should be read by anyone who studies or conducts monetary policy.

The Effects of Inflation

The first four papers deal with the motivation for reducing inflation from its already low level to one even lower. A large number of central banks have committed themselves to achieving price stability. Is this a wise policy, or are the costs of reducing inflation likely to exceed the benefits?

Robert Shiller, in his paper “Why Do People Dislike Inflation?” analyzes one of the most important but least understood costs of inflation: the unhappiness that it causes ordinary people. Shiller conducts an extensive survey of attitudes toward inflation in the United States, Germany, and Brazil. One fact that he documents overwhelmingly is that people in each country hate inflation. For example, 84% of Americans strongly agree or agree somewhat with the statement “The control of inflation is one of the most important missions of U.S. economic policy”; in Germany, 94% of those surveyed agree with a similar statement.

Shiller goes on to probe why people dislike inflation so. He finds that a common perception is that inflation erodes standards of living. The model that appears most prevalent among the public is that inflation results from the greed and incompetence of businesses and public officials, and that it does not produce any compensating increases in nominal wages. He also finds that people in all countries fear that inflation lowers national prestige.

Shiller also compares the responses of the public with those of economists. He finds that economists are dramatically less concerned about inflation than ordinary people, and that they have a much different view of the costs of inflation. These differences could suggest that widespread economic education might reduce some of the unhappiness caused by inflation. Until that happens, however, policymakers must remain cognizant of the fact that reductions in inflation appear to have substantial benefits in terms of the public’s satisfaction with life and the cohesiveness of society.

David Card and Dean Hyslop, in their paper “Does Inflation ‘Grease the Wheels of the Labor Market?’” analyze a potential cost of low inflation. It is often argued that, in a world where nominal wage cuts are rare, inflation can be very useful in allowing equilibrating changes in real wages. Card and Hyslop use panel data from the Current Population Survey and the Panel Study of

Income Dynamics on individual wages to analyze whether this positive effect of inflation exists.

The authors find that many workers' nominal wages do not change from one year to the next, and that the fraction of workers with rigid nominal wages is much higher when inflation is lower. Card and Hyslop go on to estimate what the distribution of wage changes would look like in the absence of nominal rigidities, and then use these counterfactual wage distributions to calculate the effect of reducing inflation on real wage growth. They calculate that a 1 percentage-point decrease in the inflation rate increases the rate of real wage growth by about 0.06%. While this cost of reducing inflation may sound small, it is far from trivial. These estimates suggest that a decline in inflation of 5 percentage points (a common amount of disinflation in the 1980s) raises real wages by 0.3%; if labor demand is unit elastic, this rise in real wages leads to a reduction in employment of 0.3%.

Card and Hyslop supplement their analysis of individual wages with an analysis of real wages and employment by state. While they find that local employment exerts a strong influence on local wage determination, they find little evidence that the rate of local wage adjustment is faster in a higher-inflation environment. They take this finding as evidence that the efficiency gains from the "greasing the wheels" effect of inflation in the labor market are likely to be modest.

Opponents of price stability can easily point to a large cost of this policy: the recession that would be needed to drive inflation to zero would involve significant output losses. One weakness of the existing case for price stability is that no clear large offsetting benefit has been identified. In his paper "The Costs and Benefits of Going from Low Inflation to Price Stability," Martin Feldstein argues that price stability in fact has a clear benefit that is much greater than the cost of achieving it.

The benefit that Feldstein focuses on is the reduction in tax distortions. Previous work by Feldstein and others has shown that the U.S. tax system penalizes saving and subsidizes owner-occupied housing, and that higher inflation increases these distortions. In the present paper, Feldstein begins by carefully computing the magnitudes of these distortions and their responsiveness to inflation. He finds that the distortions are large and quite responsive to inflation. For example, at 4% inflation the U.S. tax system effectively taxes consumption at age seventy relative to consumption at age forty at a rate of 330%; lowering inflation by 2 percentage points would reduce this tax rate to 270%.

The next step is to find the welfare benefits that would result from the reduced distortions brought about by lower inflation. Using existing estimates of such parameters as the intertemporal elasticity of substitution and the elasticity of substitution between housing and other consumption, Feldstein finds that the steady-state welfare benefits of a reduction in inflation of 2 percentage points are close to 1% of GDP. This estimate is only moderately sensitive to reasonable changes in the parameter values. When combined with a plausible

discount rate, these figures imply that (neglecting the issue of how quickly the welfare gains would reach their steady-state levels) the present value of benefits from reduced distortions swamp the roughly 5% of a year's GDP that would have to be sacrificed to bring about the reduction in inflation.

While Feldstein calculates the welfare gains from the reduced distortions in a partial equilibrium framework, in his comments on the paper, Andrew Abel redoes these calculations using a calibrated general equilibrium model. He takes Feldstein's estimates of the implicit tax rates and subsidies on saving and owner-occupied housing and their responsiveness to inflation, constructs a general equilibrium model of the economy, chooses plausible values for its parameters, and calculates the resulting steady-state welfare gain from a reduction in inflation of 2 percentage points. His baseline results are quite similar to Feldstein's. He then goes on to investigate the sensitivity of the results to various changes in the assumptions and parameter values.

Laurence Ball, in his paper "Disinflation and the NAIRU," argues that achieving price stability may depress output not just during the transition period, but over the long term. Specifically, he argues that a period of disinflation may increase an economy's normal unemployment rate.

Normal unemployment rose sharply in many industrialized countries in the 1980s. These increases are often attributed to a combination of a decline in the demand for low-skilled labor and labor market institutions that prevent reductions in real wages. But Ball is unable to find any evidence of a relation between increases in normal unemployment in the 1980s and any of a wide range of measures of labor market distortions. He finds instead that there is a strong relationship between increases in normal unemployment and the size and length of the disinflations that countries undertook. He also finds that the impact of disinflations on normal unemployment is larger in countries with greater labor market distortions. These results are consistent with theories of hysteresis in labor markets.

These findings have several important implications beyond simply suggesting that the costs of disinflations are higher than previously believed. First, they suggest that if a country needs both to disinflate and to reform its labor markets, it should undertake the labor market reforms first. Second, they suggest that disinflations should be done quickly. And finally, the findings call into question policies, such as more generous unemployment benefits in recessions, that attempt to lessen the burden of cyclical unemployment.

While these four studies of the costs and benefits of lower inflation move the discussion very far, they do not yet provide decisive evidence on the optimal rate of inflation. Shiller's and Feldstein's studies point to price stability as a sensible goal for policy. Card and Hyslop's paper provides evidence that inflation improves the efficiency of the labor market at least a small amount. And Ball's paper suggests that the tight policy needed to bring about disinflation may have substantial negative effects on the equilibrium unemployment rate. Given that policymakers have to choose some rate of inflation, the ambiguities

of these studies suggest that more research in the same vein is desperately needed.

Improving the Conduct of Monetary Policy

The second group of papers moves beyond the goals of policy to consider the difficulties facing central bankers in their conduct of policy. Even if policymakers are sure that they want to achieve low inflation, there may be obstacles to the realization of that goal. For example, policymakers may lack timely information about economic conditions or they may not possess the tools necessary to target inflation successfully. The papers in this section look at several important obstacles to achieving the desired rate of inflation.

Douglas Staiger, James Stock, and Mark Watson analyze a crucial obstacle to effective monetary policymaking in their paper “How Precise Are Estimates of the Natural Rate of Unemployment?” The natural rate, or the NAIRU as it is often called, is a frequently used indicator in the formulation of monetary policy. For example, if a central bank wishes to hold the inflation rate steady, it is exceedingly useful to know the level of unemployment at which inflation starts to accelerate. Despite its frequent use, the statistical accuracy of our existing measures of the natural rate is largely unknown. Staiger, Stock, and Watson seek to remedy this situation.

The authors examine two types of models of the natural rate. One is the standard expectations-augmented Phillips curve common in the literature. The other is a univariate model of unemployment based on the assumption that unemployment returns to the natural rate in the long run. In each case, Staiger, Stock, and Watson look for evidence that the natural rate has changed over time and pursue the daunting empirical task of deriving standard errors for estimates of the natural rate.

The findings of this empirical analysis are not encouraging for proponents of the usefulness of the natural rate. Staiger, Stock, and Watson find that the natural rate can be measured only very imprecisely. For example, they find that a typical estimate of the natural rate in 1990 is around 6%, with a 95% confidence interval of roughly 5 to 7%. Since this imprecision is characteristic of all the models they consider, the authors conclude that the natural rate is unlikely to be a useful tool in the formulation of monetary policy. Indeed, the imprecision of the estimates and the fact that the estimates vary substantially over time may suggest that mistaken or outdated views of the natural rate could lead to serious mistakes in policy.

“America’s Peacetime Inflation: The 1970s” by J. Bradford De Long considers one episode where the obstacles to good policymaking appear to have been insuperable. As De Long points out, the 1970s are the only peacetime period in modern U.S. history when prices rose by a substantial amount for a sustained period. In his paper, De Long considers numerous explanations for what went wrong in this decade.

One explanation that he debunks is the role of oil price shocks. Many have claimed that the 1970s were largely a period of bad luck rather than bad policy. De Long shows that wage inflation was already high before the oil price shock of 1973 and that oil price shocks appear to have had little effect on the growth rate of nominal wages. From this, he concludes that, while the supply shocks had substantial effects on both prices and output at times during the 1970s, they were not the fundamental cause of the sustained inflation.

De Long sees the fundamental cause of the inflation of the 1970s in economists' imperfect understanding of how the economy operated. He argues that the Great Depression left economists and policymakers with the view that unemployment must be controlled at all costs and with the incorrect belief that permanently lower unemployment could be bought with higher inflation. According to De Long, this view was a recipe for disaster: sooner or later policymakers were going to try to exploit the trade-off. While he believes that a period like the 1970s was bound to happen, De Long also suggests that the decade of inflation had the beneficial effects of showing that there was not a long-run trade-off between inflation and unemployment, and of building a consensus for low inflation.

In his paper "Do 'Shortages' Cause Inflation?" Owen Lamont examines whether a novel variable might prove to be a useful guide to the conduct of monetary policy. It is sometimes asserted that inflation is at least partly the result of bottlenecks or shortages in the economy: an increase in nominal demand may have a particularly strong effect on prices because of disequilibrium in the adjustment of prices and quantities. Lamont seeks to test this assertion by deriving an innovative measure of shortages and then examining its empirical relationship to inflation.

The measure of shortages that Lamont uses is the number of times in a given month that the word "shortage" appears on the front page of the *Wall Street Journal* and the *New York Times*. He then tests whether this indicator of disequilibrium is a useful predictor of inflation. Lamont's finding is that references to shortages are indeed highly correlated with future inflation. This innovative and admittedly slightly wacky variable appears to capture information not found in traditional predictors of inflation such as commodity prices, monetary aggregates, and interest rates. The usefulness of "shortages" in predicting inflation may suggest that economists should direct more attention to market imperfections in considering the effects of changes in aggregate demand. It may also suggest that policymakers should rethink the methods and variables that they use to predict inflation.

The Contribution of Monetary Institutions

While some of the obstacles to low inflation occur in the conduct of policy, still others may be inherent in the institutions set up to determine policy. For example, numerous theoretical analyses suggest that an independent central bank may be an important precondition for achieving low inflation. The three

papers in the final section of the volume seek to assess the contribution of different institutions to the success of monetary policy in the United States and abroad.

In our paper “Institutions for Monetary Stability,” we look systematically at the various sources of failures in monetary policy. We argue that dynamic inconsistency—the fact that optimizing policymakers have an incentive to expand once expectations are set—has been overrated as a cause of inflation. We suggest instead that imperfect understanding of how the economy functions on the part of economists, central bankers, elected leaders, and voters has been a much more common source of monetary policy mistakes. We support this view with numerous examples of policy failures in the United States and abroad over the last century.

We go on to analyze what this view of the source of policy failures implies about the desirability of different monetary institutions. We find that the institutions that can best deal with the problems caused by imperfect understanding are often quite different from those that can best deal with the problems caused by dynamic inconsistency. For example, limited professional knowledge about the effects of policy suggests that it would be unwise to tie policymakers to a rule that could turn out to be incorrect. In contrast, the surest way to deal with dynamic inconsistency is precisely to bind policymakers to a fixed rule.

After considering institutional solutions to dynamic inconsistency and various types of imperfect understanding, we discuss a combination of institutions that deals with as many of these concerns as possible. The most novel aspect of this institutional framework is a two-tier structure that insulates the central bank from political control, while still allowing the actual policymakers to be removed rapidly if they turn out to be incompetent. We then compare this institutional framework to the recent reforms in New Zealand and France and the proposed European Central Bank. While some of the reforms, such as those in New Zealand, come quite close to our framework, we argue that serious consideration of the importance of limited knowledge would lead to some modifications and extensions of even this carefully crafted reform.

Marta Campillo and Jeffrey Miron, in their paper “Why Does Inflation Differ across Countries?” use cross-country data to assess the role of various factors in explaining the international variation in inflation performance. In contrast to the many previous studies that have focused primarily on the role of central bank independence, Campillo and Miron consider a broad range of institutional and structural features that could affect national inflation experiences. For example, in addition to the standard legal indices of central bank independence, the authors consider institutional factors such as the exchange rate arrangement of each country. Among the structural characteristics of each country that they analyze are the degree of openness, political instability, and the government’s ability to collect taxes. They also include prior inflation experience as a possible determinant, since high inflation in the past may lead to a national consensus in favor of low inflation in the present.

Campillo and Miron estimate the relationship between average inflation over

the period 1973–89 and all of these variables for a sample of sixty-two countries. Their main finding is that structural features are far more important than institutional features in determining national inflation experiences. Indeed, they find that, when a wide range of variables is included and a broad sample of countries is considered, the conventional finding that central bank independence is important essentially vanishes. Instead, structural features that affect the size of the dynamic inconsistency problem, such as openness and political instability, appear to be more important. The need and the ability that a country has to tax also turn out to be crucial determinants of whether a given country uses inflation to generate government revenue.

This study has important implications for policymakers and economists concerned about inflation. Most obviously, it suggests that economists' focus on central bank independence as the key to low inflation is misplaced. Countries concerned about inflation may be better served by reforming their fiscal structure rather than their monetary institutions.

When it comes to low inflation, no country has been as successful in the post-Bretton Woods period as Germany. Richard Clarida and Mark Gertler try to figure out the keys to Germany's success in their paper "How the Bundesbank Conducts Monetary Policy." One of the first facts that the authors show is that, in its design and independence, the Bundesbank is essentially indistinguishable from the U.S. Federal Reserve. Therefore, any differences in inflation performance between Germany and the United States must be due to differences in the way policy is conducted, rather than in the institutional framework.

Clarida and Gertler then go on to examine German monetary-policy practices in detail. This analysis contains both a narrative description of how the Bundesbank has behaved since 1973 and empirical estimation of a sophisticated reaction function. What comes out of this analysis is the surprising conclusion that the Bundesbank has behaved since 1973 in much the same way that the Federal Reserve has operated under Alan Greenspan. Since 1973 the Bundesbank has been very concerned about inflation, but has also been willing to risk some inflation when unemployment is high.

This portrayal of the behavior of the Bundesbank raises the very interesting question of how the Germans got smart so much sooner than the rest of the world. While Clarida and Gertler do not explicitly address this question, they do provide some clues. One difference that they note between the behavior of the Bundesbank and the Federal Reserve even under Greenspan is that the Bundesbank makes explicit inflation targets. While these targets are not binding, Clarida and Gertler believe that having to publicly explain deviations from the inflation target has served to discipline German central bankers. Perhaps this one small difference in policymaking strategy is what helped the Bundesbank avoid some of the errors made by other central banks in the 1970s.

As we hope these brief descriptions of the individual papers make clear, this volume contains a wealth of information about the motivation and strategies

for attaining low inflation. While we will not claim that the ten papers here are the final word on inflation and monetary policy, they have undoubtedly moved the analysis forward by many steps. We hope that both economists and policymakers will be challenged by these essays to learn even more about the optimal inflation rate and the best way to achieve it.

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The Effects of Inflation

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