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Time-Inconsistent Monetary Policies: Recent Research

Over the past 20 years inflation in the U.S. economy has been relatively low, averaging about 2.5%; moreover, it has been relatively stable, with a standard deviation of just 1.0%. These statistics may give the impression that inflation has been tamed, or even beaten into submission. However, the period has not been without inflation scares; consider, for example, the run up in inflation prior to the 1990 recession and the preemptive policy intervention in 1994. Looking back to the 1970s, high inflation was a very real concern. Following the two oil price shocks of the 1970s, inflation ratcheted up, peaking at 10.5% in 1975 and at 9.6% in 1981. While policymakers could not have prevented the oil price shocks from occurring, the fact that monetary policy seemed unable to curtail the ensuing inflation was unsettling. Whether inappropriate monetary policies were pursued in the 1970s is an issue that has received considerable attention in recent years.

While a number of explanations have been put forward to explain the "great inflation" of the 1970s, one of the most influential is the time-inconsistency theory advocated by Kydland and Prescott (1977) and Barro and Gordon (1983). Time-inconsistency describes situations where, with the passing of time, policies that were determined to be optimal yesterday are no longer perceived to be optimal today and are not implemented. The key insight that Kydland and Prescott had was that the reason why these policies would not be implemented also could lead to inflationary policies being implemented in their place. In other words, time-inconsistency could generate higher inflation.

If one accepts that the time-inconsistency story is a good description of what went on in the 1970s (see Ireland, 1999, for an empirical analysis), then the relative absence of inflation since the mid-1980s may suggest that time-inconsistency is not a current problem for policymakers. However, time-inconsistency can affect more than just the average rate of inflation that prevails in the economy. In particular, it can influence how policymakers respond to shocks and how resources are allocated through time. This *Economic Letter* looks at time-inconsistency, describing why the same mechanisms that can lead to higher average inflation also can hamper policymakers' efforts to keep inflation stable.

Discretionary inflation bias

To see how Kydland and Prescott (1977) showed that time-inconsistency could lead to excessively high inflation, suppose that the central bank has the twin goals of trying to keep inflation close to some target level and unemployment close to the natural rate, the unemployment rate that would prevail in a world without market imperfections. Now suppose that there are market imperfections, such as monopolistic competition or union behavior, or distortions caused by fiscal policy, so that the unemployment rate that clears the labor market is inefficiently high, lying above the natural rate. To keep unemployment close to the natural rate, the central bank must try to lower unemployment below the inefficiently high rate that ordinarily clears the labor market. In this model, workers negotiate their wage rate with firms based on what they expect inflation to be. To the extent that workers correctly anticipate the inflation rate, the prevailing unemployment rate is the (inefficiently high) market-clearing rate.

As Kydland and Prescott showed, in this model the central bank's desire to reduce unemployment to the natural rate leads to time-inconsistent behavior. Suppose that the inflation target is 2%; the optimal monetary policy recognizes that workers cannot be systematically fooled and, consequently, that the unemployment rate cannot systematically depart from the market clearing rate. Despite its twin goals, therefore, the best the central bank can do is announce that it will set monetary policy such that inflation equals 2%, and then follow through on that announcement and let the labor market clear at the market-clearing level.

But this optimal policy is time-inconsistent and will not be implemented. If workers believe the central bank's policy announcement and negotiate

a contract with firms providing for a 2% nominal wage increase, then the central bank's range of options changes. Instead of following through and implementing the announced policy, the central bank can create a little more inflation—an inflation surprise—which lowers workers' real wages, stimulating firms' demand for labor. With the nominal wage rate fixed, the labor market now clears at a lower unemployment rate. Thus, at the cost of slightly higher inflation, the economy reaps the benefit of lower unemployment. Kydland and Prescott showed that, in balancing these costs and benefits, the central bank would find it advantageous to create the inflation surprise and not implement the announced policy.

Of course, workers soon will realize that the central bank's announcements are not credible, and they will come to expect higher inflation. And when workers expect higher inflation, it becomes increasingly costly for the central bank to create an inflation surprise. The equilibrium outcome is for inflation to rise to the point where the central bank finds that the benefits of any additional inflation surprises are fully offset by their costs. At this inflation rate, the central bank has no incentive to create an inflation surprise. But because there are no inflation surprises, workers fully anticipate the inflation rate, and the labor market does not clear at the natural rate of unemployment: instead the higher market-clearing rate prevails. Sadly, the fact that the central bank can revisit its announced policy after wages are set leaves the economy with inefficiently high inflation, but no reduction in the unemployment rate. The discrepancy between the average inflation rate that occurs and the inflation target is known as the discretionary inflation bias.

Relating the Kydland and Prescott story back to the 1970s, the oil price shocks drove up firms' production costs and led to rising unemployment, thereby giving policymakers an incentive to create inflation surprises. Through policymakers' efforts to keep the unemployment rate in check, inflation blossomed; the unemployment rate crept up regardless, particularly following the 1974 oil price shock.

However, the Kydland and Prescott story is more than just a sophisticated way of explaining high inflation; it has other profound consequences. For example, time-inconsistency can affect a government's ability to issue nominal debt (bonds) or alter the type of asset that a government uses to issue debt. The expected real return on nominal debt depends on the purchaser's expectation of future inflation. If investors purchase the bonds anticipating a tight monetary policy, and hence lower future inflation, then they will pay a higher price for the bonds than if they expected a loose monetary policy and higher future inflation. But while a central bank may promise a tight monetary policy, once the nominal debt has been issued, the government may pressure the central bank to pursue an expansionary monetary policy in order to inflate away the real value of the government's nominal liabilities. Anticipating the government's incentives, investors will demand higher rates of return on government bonds, or they may require that the rate of return on bonds be indexed to inflation outcomes.

Stabilization bias

But time-inconsistency is not just a phenomenon that produces high inflation rates. Indeed, recent literature has focused not on the average inflation rate, nor on the discretionary inflation bias, but instead on how time-inconsistency affects the economy's transition through time and how it affects policymakers' ability to stabilize inflation (Dennis and Söderström 2002). Because time-inconsistent policies can alter how the economy evolves over time and how the economy responds to shocks, it is important even in environments where inflation is low.

Consider again a central banker whose objective is to keep inflation close to some target rate and the unemployment rate close to the market-clearing level. Typically, a central banker must trade these two objectives off against each other: a negative supply shock, such as an adverse productivity shock or an oil price shock, raises both unemployment and prices, and moving interest rates to mitigate the movement in either variable has adverse effects on the other. Recognizing this trade-off, when a supply shock occurs, the central banker must take a gradual approach, returning inflation to its target rate over a number of periods, so as not to create unnecessary unemployment. But households' and firms' expectations about future inflation are also important because they affect how households and firms behave today. If households (which are also workers) expect that inflation will be higher in the future, then they will want to negotiate larger wage increases today, and firms will want to raise their prices today. So, how should a central banker respond to the higher unemployment and the inflationary pressure caused by an adverse supply shock, such as an oil price hike?

The answer depends on the assumptions in the model used. However, in many popular sticky-

price models, central bankers should respond to an adverse supply shock by raising interest rates and promising to keep them high for a prolonged period. Higher interest rates induce households to cut current consumption and to save for future consumption instead. Facing lower demand for their product, firms must temper any price increases to avoid losing profits, which moderates current-period inflation. In addition, the promise to keep interest rates high for a prolonged period causes households and firms to expect that inflation will be lower in the future than it is today. Because they expect lower future inflation, households are prepared to negotiate lower nominal wage increases, which further allows firms to keep price increases down. Thus, through inflation expectations, the promise to keep monetary policy tight over the foreseeable future helps to reduce current inflation and, if the promised policy is implemented, future inflation also will be lower. In addition, because the policy tightening is spread out over time, it does not increase unemployment as much as it would if the tightening occurred all at once.

Unfortunately, this policy is time-inconsistent and will not be implemented. The problem is that the promise to keep monetary policy tight over the foreseeable future damps the inflationary impact of the adverse supply shock. But having promised a tight monetary policy, and having secured lower inflation today, the central banker now has less incentive to implement the promised tight policy in the future. Realizing that when the future actually arrives the central banker will not implement the tight monetary policy that it promised, households and firms will expect higher inflation in the future than if the tight policy were implemented. As a consequence, to damp the inflationary effect of the adverse supply shock, central bankers have to raise interest rates more today, generating more unemployment, than they would if they could commit themselves to implement the tight policy that they promised. In this scenario, the effect of the time-inconsistency is called stabilization bias because the time-inconsistency affects the central banker's ability to stabilize inflation expectations and hence stabilize inflation itself. The stabilization bias adds to inflation's variability, making inflation more difficult for households, firms, *and* the central bank, to predict.

To examine whether the stabilization bias caused by a central bank's inability to commit to its optimal policy is important, Dennis and Söderström (2002) study a range of macroeconometric models. In these models, the stabilization bias manifests itself through greater inflation variability and lower output variability, much as if the central bank had an objective function that underweighted the importance of inflation stabilization and overweighted the importance of output stabilization. For the models that Dennis and Söderström looked at, a typical result is that distortions caused by stabilization bias are as undesirable, and as harmful, as a permanent 1.0 to 1.5 percentage point increase in inflation.

Conclusion

A discretionary inflation bias caused by time-inconsistency is one popular explanation for the great inflation experienced during the 1970s. If the only effect time-inconsistency had on economic outcomes were to raise the average inflation rate, then it might appear that, given today's low inflation rates, time-inconsistency is not a problem that current policymakers need to contend with. However, as this *Economic Letter* has shown, in addition to its impact on the level of inflation, time-inconsistency also has important consequences for how the economy responds to shocks and for the volatility of inflation, output, and interest rates. To the extent that time-inconsistency leads to unnecessarily high inflation volatility and to a misallocation of resources through time, the causes of time-inconsistency and the associated benefits to precommitment cannot be easily ignored.

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