Federal Reserve Interest Rate Smoothing

Marvin Goodfriend

Mark Toma's interesting paper on the theory of reserve requirement regulations explains such requirements as resulting from a government revenue-raising motive. I do not intend to address the details of Toma's argument or to comment directly on the plausibility of the view that reserve requirements are simply a tax. Nor will I discuss the specifics of his public choice theory explaining the structure of reserve requirements. Instead, this article focuses on a related topic, that of Federal Reserve interest rate smoothing. As shall become clear, the discussion here supports Toma's hunch on how to explain reserve requirements.

A discussion of interest rate smoothing is appropriate for a number of reasons. In recent years the theoretical feasibility of interest rate smoothing has been demonstrated in coherent rational expectations models. (See, for example, McCallum 1986 and Goodfriend 1987a.) This development has paved the way for sensibly interpreting the comments of Fed watchers who persistently characterize Federal Reserve policy as choosing the level of short-term interest rates. It also makes sense of the extensive institutional evidence that the Fed can and has smoothed interest rates throughout its history. (See Goodfriend 1987b.) In addition, empirical work by Miron (1986), Mankiw and Miron (1986), and Barro (1987) provides evidence of both seasonal and cyclical Fed interest rate smoothing. Giving interest rate smoothing a central place in thinking about monetary policy thereby reconciles analytical, financial market, institutional, and empirical

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The author is Vice President and Reseach Economist at the Federal Reserve Bank of Richmond. The views expressed here do not necessarily reflect those of the Federal Reserve Bank of Richmond. The paper was written while the author was Visiting Associate Professor at the University of Rochester.

evidence. The attractiveness of the interest rate smoothing view of monetary policy comes in part from this reconciliation.

As discussed below, the fact that the Fed has employed interest rate smoothing throughout its history implies that the standard rationale for reserve requirements—that they are necessary for monetary control—has been highly misleading. The interest rate smoothing characterization of monetary policy thereby provides indirect support that reserve requirements have functioned exclusively as a tax. This supports Toma's view that the structure of reserve requirements must be explained as a government revenue-maximizing motive.

In addition, pursuing the analytical and empirical implications of interest rate smoothing seems to be a promising way of developing a better understanding of monetary policy as it is actually conducted. In other words, it provides a realistic way of pursuing the positive theory of monetary policy. Historically, economists have emphasized the normative aspects of monetary policy, suggesting models of what the Fed ought to do, but they have found their advice largely ignored. Perhaps by using the interest rate smoothing view, economists can better understand the objectives and constraints facing the Fed so that policy advice can be made more relevant, tailored better to the realities of central banking, and have a better chance of being implemented.

How Interest Rate Smoothing Works

An oral tradition in monetary economics holds that the central bank cannot control nominal interest rates directly. For example, it asserts that the central bank cannot peg the nominal interest rate because doing so would make the price level unstable or indeterminant. This view dates back at least to Wicksell (1898, 1905). It was echoed by Friedman (1968) and received a more formal restatement in Sargent and Wallace (1975). This view, however, has been successfully challenged in recent years. First, McCallum (1981) showed that a monetary authority could run an adjustable nominal interest rate peg and generate a stable, determinate price level. The stability and determinacy of the price level under an absolute nominal interest rate peg was demonstrated by Dotsey and King (1983) and Canzoneri, Henderson, and Rogoff (1983). McCallum (1986) related these new developments to the real bills doctrine. Goodfriend (1987a) discussed the definitions, mechanics, and implications of interest rate smoothing in a positive theory of central bank behavior. It must be emphasized that these papers explain the feasibility of price level determinacy with *nominal* interest rate smoothing by the monetary authority.

Whether the monetary authority can smooth real interest rates is a separate and more controversial matter. This discussion assumes that the monetary authority cannot influence real interest rates.

To understand the mechanics of nominal interest rate smoothing, consider Goodfriend's (1987a) model, which has three basic equations. First, it has a money demand function. Second, it has a Fisher equation relating the nominal interest rate to an ex ante real interest rate component plus an expected inflation component. It is helpful to conceive of the Fisher relation as an arbitrage condition equalizing expected real yields on nominal bonds with the real interest rate that clears the economywide goods market. Third, the model has a money supply rule that explains how the central bank generates the nominal money stock. The details of the money supply rule are unimportant for this discussion. What is important is that at each point in time, the money supply rule allows the public to form a determinate expectation of the future nominal money stock.

Interest rate smoothing works as follows. The money supply rule pins down the expected future nominal money stock each period. This, together with expected future real demand for money, implies an expected future price level. Suppose the central bank is pegging the nominal interest rate. The market sets the real expected yield on nominal debt equal to the goods market clearing real rate by bidding the current price level to the point where the pegged nominal rate less expected inflation just equals the required real interest rate.

A key feature of this equilibrium is that the current price level is determined by working backward from expectations about the future price level, through the expected inflation necessary to convert the nominal interest rate peg into the required real yield. Current nominal money growth, therefore, does not cause inflation under interest rate targeting. The current price level is determined by the level of the nominal interest rate peg, together with the goods market clearing real interest rate and future expected nominal money supply and demand.

Suppose the money supply rule were to pin down the future price level at a fixed target so that the price level were stationary. In this case, nominal interest rate smoothing would make the real interest rate shock move the current price level around. That is, the expected inflation or deflation required to convert the real yield on nominal debt into the required ex ante real rate would be achieved by bumping around the current price level.

In practice, central banks are uncomfortable allowing the current price level to be erratic. Long-term nominally denominated contracts in credit and labor markets may allow surprise price level movements

to have potentially destabilizing effects. Goodfriend (1987a) has shown that a central bank wishing to minimize price level forecast error and smooth nominal interest rates can create the necessary inflation or deflation by moving the expected future price level around instead. Such a policy, however, makes both the price level nonstationary and the money stock exhibit "base drift." (See Goodfriend 1987b for a discussion of base drift.) It converts temporary real interest rate movements into permanent jumps in the money stock and price level. As the forecast horizon recedes, price level and money stock forecast error variance go to infinity. In this sense, interest rate smoothing creates macroeconomic instability. It appears that interest rate smoothing is a policy widely followed by world central banks because they believe that the financial stability it buys is worth the cost in increased price level instability. It remains unclear to me, however, whether this often-heard rationale for interest rate smoothing accords with its actual explanation. We need much future work on this question.

Finally, in this section, I want to apply the theory of interest rate smoothing to explain why reserve requirements are unnecessary for monetary control. The standard view is that reserve requirements are useful in enabling the central bank to better control the money stock. (See Friedman 1960, p. 50.) In this view, reserve requirements operate by stabilizing the money multiplier, thereby allowing the central bank to control bank deposit money with its total reserve instrument. But under interest rate smoothing as practiced by the Federal Reserve, the money multiplier does not play a causal role in nominal money stock or price level determination. Under interest rate smoothing, the current price level is determined by the chosen level of the nominal interest rate, the goods market clearing real interest rate, and the expected future price level. Current-period money demand, depending, of course, on the current price level, is accommodated by the central bank at the chosen current nominal interest rate. Reserve requirements simply help determine the quantity of monetary base that the central bank must supply currently to provide that accommodation. But reserve requirements do not help determine the money stock.

Institutional Means of Interest Rate Smoothing

The Federal Reserve has achieved its interest rate targets over the years in varied and somewhat complicated ways (Goodfriend 1987b). In the 1920s the Fed used relatively little nonprice rationing at the discount window. It forced the banking system to obtain a portion of monetary base demanded by borrowing at the window. But because

there was little nonprice rationing, the discount rate, roughly speaking, provided a ceiling for other interest rates. The discount rate was raised and lowered to adjust the level of short-term interest rates, with appropriate adjustments to nonborrowed reserves so that banks were continually induced to borrow some monetary base at the window.

During most of the 1930s, the discount rate was above market rates, so borrowing at the window was negligible. From 1933 to the end of the decade, the Fed held its portfolio of government securities essentially constant. The Fed, therefore, could not be construed as smoothing interest rates during this period. Interest rates, however, were extremely low, less than 1 percent, and were more or less smoothed any way because they were near their lower bound of zero. So there would have been no need for the Fed actively to smooth interest rates. Later, in the 1940s, the Fed smoothed interest rates as part of its government security price pegging policy during and after World War II.

A procedure similar to that used in the 1920s was also used in the 1950s and 1960s after the Treasury–Federal Reserve Accord. The difference was that the target for borrowed reserves was varied more often to affect slight changes in the level of rates without always changing the discount rate. In the 1970s the Federal Reserve used an adjustable federal funds rate peg by establishing bands of 50 basis points, on average, within which it would keep the funds rate by appropriate open market operations whenever the limits of the band were hit.

The Fed's move to reserve targeting in October 1979 did not mean abandoning interest rate smoothing. Because reserve requirements were lagged (until February 1984), reserve demand was predetermined within a given reserve statement week. Hence, by choosing a nonborrowed reserve target in a given week, once again the Fed used a procedure whereby it essentially chose a quantity of reserves the banks would have to borrow at the discount window. Given Fed nonprice rationing, the demand for discount window borrowing is a function of the spread between the federal funds rate and the discount rate. By choosing the volume of forced borrowing together with the discount rate, the Fed in effect selected a level of the federal funds rate on a week-by-week basis. This procedure amounted to a kind of noisy interest rate smoothing because of the unpredictable variability in the demand schedule for discount window borrowing. Moreover, it was one in which reserve requirements played an inessential role; an identical path for the nominal interest rate could have been produced by choosing a level for the funds rate directly. Even

since reserve requirements were made contemporaneous in February 1984, ostensibly to improve monetary control, the Fed has continued to target borrowed reserves or the federal funds rate, so the structure of reserve requirements has remained irrelevant to monetary control.

Empirical Evidence on Interest Rate Smoothing

I referred in the introduction to recent empirical evidence of interest rate smoothing. Miron (1986) has shown that the Fed removed a pronounced seasonal fluctuation in the nominal interest rate that ranged about 6 percentage points from 1890 to 1914. Of course, earlier authors such as Friedman and Schwartz (1963) recognized this. Mankiw and Miron (1986) cannot reject the view that the short-term interest rate is a random walk after the founding of the Fed, but not before. They suggest their finding represents interest rate smoothing behavior on the part of the Fed.

Barro (1987) used Goodfriend's (1987a) model of interest rate smoothing with a public finance view of the Fed's nominal interest rate target. Goodfriend assumed a constant nominal interest rate target to illustrate the mechanics and feasibility of interest rate smoothing. His simplifying assumptions made the nominal interest rate a serially uncorrelated white noise process. As mentioned above, Mankiw and Miron found it to be approximately a random walk. Barro appended a random walk nominal interest rate target generating equation to Goodfriend's model. In an earlier paper, Barro (1979) showed that optimal tax policy involves the government making the tax rate a random walk. Pointing out that the nominal interest rate is the tax rate on the monetary base, Barro justified his nominal rate random walk equation as optimal tax policy. His justification for the random walk interest rate target follows from and is empirically substantiated somewhat by Mankiw (1986).

Kimbrough's (1986) argument, however, weakens the optimal tax policy rationale. He showed that if money is explicitly modeled as an intermediate good that helps to affect the conversion of scarce resources into consumption goods, then it is not optimal to use an inflation tax to help generate revenue. Instead, optimal taxation calls for adopting the optimum quantity of money rule in which the government generates a rate of deflation that makes the nominal interest rate zero.

Nonetheless, with some additional modifications, Barro derives and tests joint restrictions on the inflation and monetary base generating processes implied by Goodfriend's model coupled with the

random walk nominal interest rate target generating process. Barro's results are for the period 1890 to 1985. He rejects the model for the period before the establishment of the Fed, finds mixed results for the interwar period, but cannot reject the model for the post–World War II period. In short, his results are encouraging though preliminary.

Conclusion

This paper has argued that nominal interest rate smoothing has been an important feature of monetary policy as practiced by the Federal Reserve. It has drawn on recent theoretical, institutional, and empirical work to make the point. By documenting the interest rate smoothing view and by pointing out that reserve requirements serve no monetary policy purpose under it, the discussion has provided indirect support for the view that reserve requirements must be explained as a tax.

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The FSLIC Is "Broke" in More Ways Than One

Gillian Garcia

As a result of both the savings and loan industry crisis that began earlier in the decade and inappropriate regulatory policies, the FSLIC is now "broke." Its bankruptcy makes it principal among the thrift industry regulators because the plight of the FSLIC prevents it, as well as the other S&L regulators, from taking the actions needed to ensure the future prosperity of the industry. Regulators have been forced to make "second best" regulatory responses that are frequently so ineffective they render the system of regulatory policies itself "broke." In turn, this set of destitute policies, together with punitive actions from Congress and the administration requiring healthy thrifts to bear the burden of industry clean-up, could conceivably bankrupt the entire savings and loan industry.

The most important regulatory error, which will be the focus of this paper, is the decision to allow large numbers of insolvent and low-capital S&Ls to continue functioning, often for long periods of time and almost as a matter of course. The continued operation of these bankrupt institutions exposes the insurance corporation to moral hazard and the S&L industry to adverse selection as the owners and managers of insolvent insured thrifts are given the opportunity to enjoy any benefits from the gambles they undertake with depositors' funds while passing the losses to their insurer, healthy thrifts, or the taxpayer. These losses have proved heavy and are rapidly increasing the degree of the FSLIC's insolvency.

The continued operation of thrifts that have failed the market test of survival of the fittest, threatens the viability of the industry itself

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The author is Director of the Economic Analysis Group at the U.S. General Accounting Office and an Adjunct Professor of Finance at Georgetown University. She thanks Lawrence Cluff, Elizabeth Mays, Norman Miller, and Kevin Yeats of GAO's thrift team for assistance with the data. The views expressed are the author's and do not necessarily represent those of the General Accounting Office.