

Policy-Rule Retrospective on the Greenspan Era

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1. Introduction

The recent passing of the Federal Reserve Board's Chairmanship from Alan Greenspan to Ben Bernanke generated a deluge of commentary in the press, both inside and outside of the United States. Most of the writings were marked by a celebratory tone, presumably as a consequence of the excellent record of inflation containment and real income growth that was compiled in the United States during the 18 years of Greenspan's tenure. There was some critical commentary, however, most notably in articles in the Economist (2006a, 2006b, 2006c) that complained about the U.S. housing price boom of recent years, the absence of any institutionalization of Greenspan's policy-making procedures, and the manifest disregard by the Fed—as well as many other central banks—of the behavior of monetary aggregates.

In an attempt to provide an analytical perspective on some of the relevant issues, the present paper develops a quantitative retrospective on the Greenspan years as viewed through the lens of two alternative guidelines for the conduct of monetary policy. These guidelines are typically referred to as policy rules, since they are, for the sake of concreteness and clarity, expressed in the form of algebraic formulas pertaining to the management of the central bank's policy instrument (or “operating target”). The first of these is the well-known Taylor rule, introduced by John B. Taylor (1993) in a 1992 conference at Carnegie Mellon

University, while the second is a scheme promoted by the present author in a series of papers including McCallum (1988, 1990, 2000). The Taylor rule has the notable advantage of being expressed in terms of the policy instrument that the Fed actually uses, the overnight Federal Funds rate. The McCallum rule, by contrast, specifies movements in the growth rate of the monetary base, a narrow aggregate that includes currency outstanding plus bank reserves at the Fed, which the Fed (like most central banks) does not attempt to control from month to month. This difference in realism is not undesirable in the context of our present concerns, however, since the second rule provides one natural means for bringing monetary-aggregate considerations into the policy process.

2. Preliminaries

It is necessary to begin with a quick review of the two rules and also a discussion of one adjustment that will be made to the data. Since a policy-induced increase in interest rates is generally regarded as representing a move toward more restrictive policy, the Taylor rule calls for a higher setting of the Federal Funds (FF) rate when inflation is (or is expected to be) above target and/or output is high relative to capacity.¹

Specifically, the Taylor Rule can be written as

$$(1) \quad R_t = r + \Delta p_t + 0.5(\Delta p_t - \pi^*) + 0.5 \tilde{y}_t$$

where the symbols in this equation are as follows: R_t = FF interest rate setting for quarter t , percent per year; r = average equilibrium real interest rate, percent per year; Δp_t = inflation rate, recent or expected future value; π^* = target rate of inflation; \tilde{y}_t = deviation of current real GDP from potential or natural-rate value, percent. In his work, Taylor has typically used 2 percent for the average real rate of interest and has also assumed that 2 percent per year is

¹ The following discussion is adapted from my SOMC paper of Nov. 18, 2002, i.e., McCallum (2002).

the Fed's target rate of inflation.² Different values could be specified for the coefficients on the terms $\Delta p_t - \pi^*$ and \tilde{y}_t , but the values of 0.5 were used in Taylor's original work and have been adopted by many analysts since then. Note that the presence of the term Δp_t on the right hand side of (1) implies that a measure of the real rate of interest, $R_t - \Delta p_t$, is adjusted up or down relative to the average real rate r in response to departures of inflation and output from their target values. Each period's Δp_t value is being used as a proxy for inflation expected over the near future.

Next we describe the more "monetarist" rule that I have promoted. This rule specifies the growth rate of the monetary base that the Fed should generate, rather than the value of the FF interest rate. Although in fact the Fed does not control growth of the monetary base, it could do so if it chose to³ and, in any event, we can use this growth rate as an indicator of monetary policy ease or restrictiveness, even if the Fed is not operating so as to exert control of this rate. The rule can be written as

$$(2) \quad \Delta b_t = \Delta x^* - \Delta v_t + 0.5(\Delta x^* - \Delta x_{t-1}).$$

Here the symbols are: Δb_t = rate of growth of the monetary base, percent per year; Δv_t = rate of growth of base velocity, averaged over previous four years; Δx_t = rate of growth of nominal GDP; Δx^* = target rate of growth of nominal GDP. In rule (2) the target value Δx^* is taken to be the sum of π^* , the target inflation rate, and the long-run average rate of growth of real GDP (which is presumably unaffected by monetary policy). I take the latter to be 3 percent per year, so with an inflation target of 2 percent, we have Δx^* equal to 5. The term

² Most SOMC members would prefer a somewhat lower inflation target.

³ Since both components of the monetary base appear on its own balance sheet, the Fed can monitor its value on a daily basis and make adjustments as needed to keep it at any desired level on average over (say) a week.

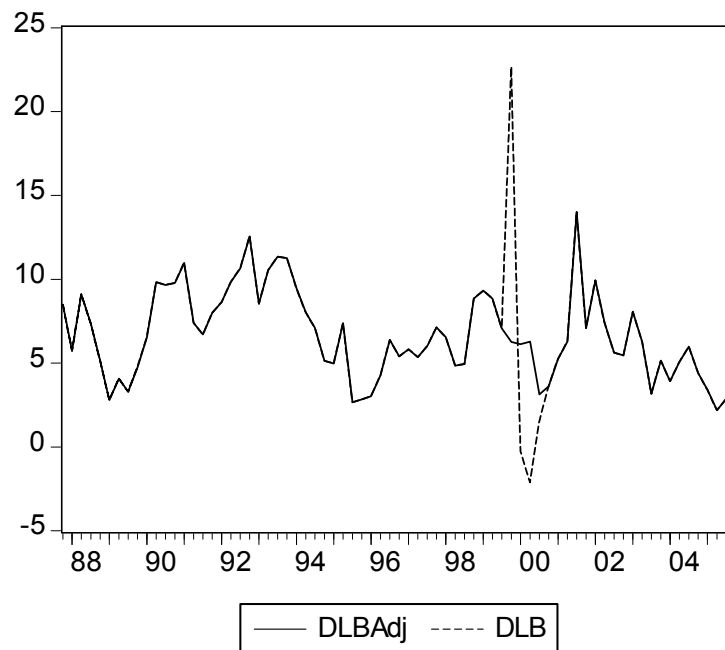
Δv_t is necessary because technological and regulatory changes alter the growth of base velocity from year to year. The rule's measure relating to the past four years is intended as a forecast of the average growth rate of velocity over the foreseeable future; it is not intended to reflect current cyclical conditions. These are represented by the final term, $\Delta x^* - \Delta x_{t-1}$, which is positive when recent growth of output and the price level has been slow. A large resulting value for Δb_t is a signal for monetary ease, represented by a rapid rate of increase in the monetary base—which tends to generate or support a rapid rate of increase in broader monetary aggregates and thereby stimulate aggregate demand.⁴

The figures used for the monetary base in the following exercises are the adjusted base as calculated by the Federal Reserve Bank of St. Louis, the adjustments serving to take account of changes in legal reserve requirements that alter the quantity of medium-of-exchange money (such as M1) that can be supported by a given quantity of the base. Use of this adjusted series is standard in work of this type. In addition, I have made one non-standard adjustment that is called for by a highly unique event. Specifically, at the end of 1999, the Fed injected a huge amount of currency into the economy so as to prepare the banking system for the possibility that there would be a major upsurge in demand for currency at the end of the last millennium since, if such an upsurge in demand was not met, a panic could be induced. The currency was injected during the fourth quarter of 1999 and removed promptly during the first two quarters of 2000. Most of this currency simply went into the banking system, in case it was needed to meet public demands, and had no effect on the economy. But the measured base growth rates for a couple of quarters were extremely large in absolute value, so their inclusion in the time series would produce some drastic

⁴ For more discussion of this rule, see McCallum (2000, 2002).

spikes in the velocity series that enters in rule (2) Accordingly, I have removed the (estimated) effects of this millennium injection from the base series.⁵ The result of this adjustment is shown in the following diagram, Figure 1.

Figure 1



3. Basic Comparisons

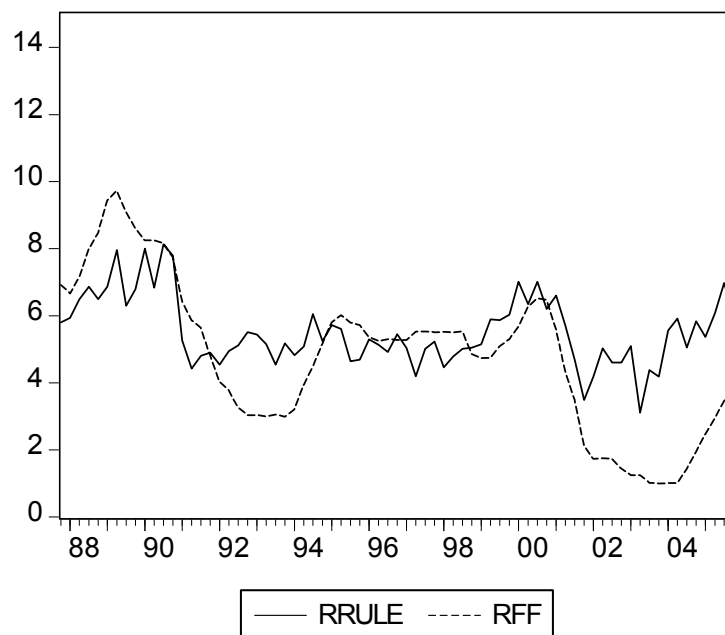
Let us begin the analysis by plotting, in Figure 2, the actual values of the FF rate for each quarter over 1987.4-2005.4 (labeled RFF) together with the values called for by the Taylor rule (RRULE).⁶ We see that for the first 14 years of the Greenspan era, there was a rather strong correspondence between the two series, indicating that actual U.S. monetary policy was being conducted as if the Taylor rule was being followed by and large (although

⁵ Specifically, I regressed LB (log of the base) on its previous value, a trend term, a constant, and dummy variables for 1999.4, 2000.1, and 2000.2. Using the estimated coefficients, the value of LB was adjusted downwards by 0.041, 0.025, and 0.004 for these three periods.

⁶ The data comes from the St. Louis Fed's web page for FRED and is dated April 1, 2006.

there were noticeable departures in 1989 and 1992-93). Over the final four years 2002-2005, however, the actual settings of the FF rate were consistently well below the values called for by the rule. A discrepancy of this magnitude, sustained for this span of time, indicates either that policy was misguided during the four-year interval or else that the Taylor rule was not giving appropriate signals as guidance for monetary policy-making.

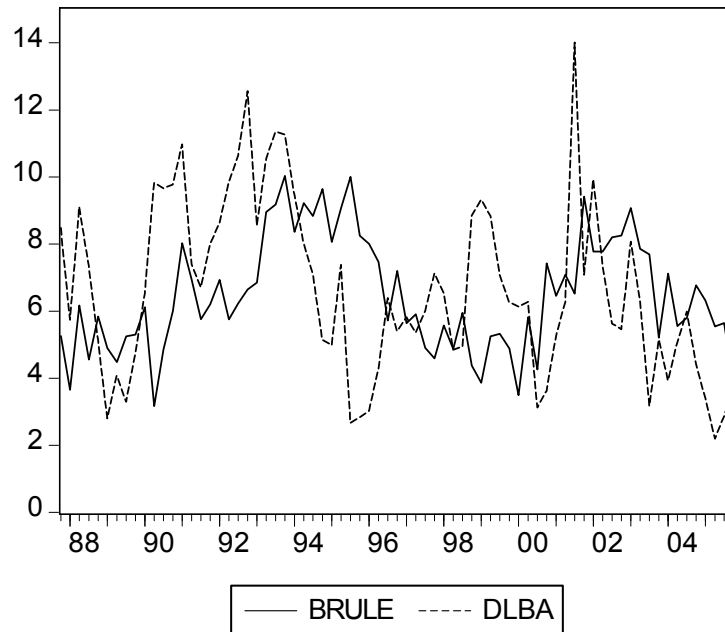
Figure 2



An analogous plot is reported for the base-money rule (2) in Figure 3. There the reader’s first impression may be centered on the choppiness of the two series. A moment’s reflection suggests, however, that the choppiness in the actual base growth figures (DLBA) is exactly what should be expected, given that the Fed does not attempt to regulate base growth rates and its widely-recognized practice of “smoothing” interest rates tends to induce erratic behavior in the monetary base series. We will discuss variability of the rule-prescribed series (BRULE) below. For now, our second main observation regarding Figure 3 is that major discrepancies between rule-specified and actual values have not been long-lasting in nature.

In particular, the discrepancy over 2002-05 is not nearly so pronounced as in the Taylor-rule plot in Figure 1. The plotted values suggest, moreover, that actual policy was slightly tighter on average than specified by the rule over 2002-05, which contrasts sharply with the Figure 1 indication that actual policy was much too loose over that four-year span. In this respect, the

Figure 3



Economist's concern about neglect of aggregates tends to undercut its worry about excessively loose policy during the period in question.

The largest discrepancy is for the years 1994-95, during which actual policy was tighter than the base rule (2) would have recommended. Goodfriend's (2002) useful narrative account describes the Fed as eliminating policy looseness during 1994—a looseness that shows up in both Figures 2 and 3. Figure 3 suggests that the Fed overdid the tightening process, a suggestion not shared by the FF rate rule in Figure 2. Other differences in policy evaluation pertain to 1992-93 and 1988, periods for which the base rule (2)—but not the FF

rate rule (1)—suggests that policy was somewhat looser than the rule would call for.⁷ All in all, however, a comparison of Figures 2 and 3 suggests that actual policy during the Greenspan era has not differed from that recommended by the McCallum rule by a significantly greater extent than is the case for Taylor rule. Given the record for 2002-05, the opposite might even be true. This finding contrasts sharply with the conventional wisdom of recent years, which would suggest that rules based on interest rates are much more “realistic,” i.e., in conformity with the practice of well-run central banks, than rules based on base-money growth or other measures of monetary aggregate behavior.

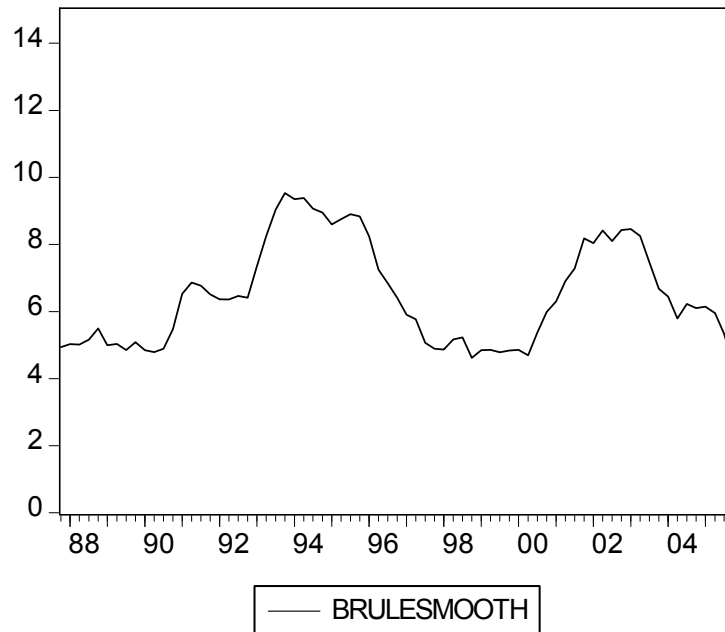
3. Technical Issues

In reaching the foregoing conclusion, we have implicitly treated a given percent difference between the plots in Figure 1 as equally important as the same percent difference in the plots in Figure 2. Some readers might question this presumption, arguing that percentage interest rates are not the same thing as percentage money-growth rates. I would defend my practice, however, on two grounds. First, the unit of measurement, 1/years, is the same for both figures. In this regard, from the perspective of steady state analysis, it is true that a one-percent change in base money growth will result in a one-percent change in the nominal interest rate. The difficulty with this argument is that short-run changes in interest rates do not correspond to long-run changes in those rates. Indeed, short-run and long-run movements in interest rates are not even in the same direction—an increase (tightening) in the FF rate may be necessary today in order to yield lower rates on average in the future. This aspect of interest rate policy would seem, however, to reflect a disadvantage of interest rates as key indicators for use in the design of monetary policy

⁷ Both rules (1) and (2) signal loose policy during 1992-93.

A related but somewhat different concern is whether the behavior of the base growth targets specified by the McCallum rule is just too great to permit base growth to be of use in practice. If that is deemed a problem, however, rule (2) could be modified so as to use the average nominal GDP growth rate over the past 4 quarters, rather than just the value for the most recent quarter, in the rule's final term. (This would be analogous to the Taylor rule's use of a four-quarter inflation rate for comparison with the target value.) This modification of the rule would have produced a pattern over the Greenspan era as shown in Figure 4. There the smoothness of the base-growth indicator/instrument seems entirely satisfactory. As

Figure 4



another possibility, the Fed (or any central bank) could use the base-growth rule (2) to generate “desired” base growth values each quarter, and then use weekly FF rate adjustments to move toward these moving intermediate targets while continuing to smooth interest rates. This type of procedure is analyzed, with encouraging results, in McCallum (1995).

4. The Economist's Critique of Greenspan

I, like other members of the SOMC, believe that it is probably a mistake for central banks to ignore the role of monetary aggregates to the extent that is currently the case for many of them, including the Fed. Accordingly, we are pleased that The Economist, arguably the world's best non-professional publication on economic affairs, is currently arguing for more attention to be paid to behavior of the aggregates. There are, however, several aspects of the publication's position that this writer finds problematic. A few words on these points is warranted, to counteract possible misunderstanding. First, in the March 23, 2006, article, it is stated that "Once, a central banker who did not believe in monetarism would have been viewed as equivalent to a priest who admits to being an atheist," and the time indicated seems to be approximately 25 years ago. In the years around 1981, however, there were only a few central banks that actually conducted policy on monetarist lines—the Bundesbank and the Swiss National Bank come to mind. Policymakers and economists at the Bank of England certainly did not fit that description and Fed did not either. The admirable Volcker disinflation was built upon some monetarist rhetoric, but the Fed's practice and beliefs were far from monetarist—on this point see Friedman (1983) and Brunner and Meltzer (1983). Second, The Economist expresses concern over the Fed's recent step to cease publication of data series on M3, a highly inclusive measure of money. I would argue, however, that M3 is so highly inclusive that it hardly qualifies as a measure of money. To qualify for the latter, the aggregate in question should possess some characteristics that differentiate it from non-monetary aggregates. Two coherent concepts of money are assets that serve (to a substantial degree) as media of exchange and assets that represent outside money, directly under the tight control of the central bank. The measure M1 met the first criterion in by-gone days—

unfortunately there is no such asset today—and the monetary base (i.e., high-powered money or M0) served and continues to match the second criterion. But M3 does not. If one wants a highly inclusive aggregate, he is better off using nominal GDP (or some other broad nominal spending measure), which amounts to a “velocity adjusted” measure of money.⁸ Thus, I am bothered by the neglect of money, but do not see the lapsing of M3 statistics as troublesome in itself (as distinct from serving as an indicator of a troublesome attitude). Finally, I find it peculiar that the Economist would argue for a more monetarist approach and also for giving independent attention to asset prices, apart from any role that they might have as predictors of future inflation in terms of the usual price indices for current goods and services. It is strongly my perception that economists, who are known to be of the monetarist persuasion, find it inappropriate for the central bank to give an independent role to asset price movements. These are relative price movements, which do not warrant separate attention, according to basic monetarist doctrine. The Economist responds to this criticism by stating that it does not favor “targeting” of asset prices; but if that is the case then its criticism is unwarranted since typical central banks today certainly do use asset price movements as one indicator of future magnitudes of general inflation rates. What the recalcitrant central banks do not do, is to treat asset price behavior as a variable that they should respond to even when CPI inflation is behaving as desired.

5. Conclusions

Let us close by summarizing the somewhat disjoint messages of the foregoing pages. It is widely believed that the conduct of monetary policy during the Greenspan era was excellent. Is there some simple and systematic formula that would do a reasonable job of matching the policy behavior of the Greenspan years? The foregoing sections explore two

⁸ The phrase is Tobin’s (1983, p. 516).

different quantitative guidelines for thinking about policy settings, an interest-rate rule based on the well-known Taylor (1993) rule and a base-money growth rate rule developed by McCallum (1988, 2000). It is widely believed that only interest-rate rules can be useful in this regard, but the foregoing retrospective on the Greenspan years tells a different story. Whereas the prescriptions of the Taylor rule differed greatly from actual settings over the extended period 2002-2005, there was no major sustained discrepancy between actual practice and the settings of the base money rule during the 18 years of Greenspan's tenure. This basic compatibility is masked by the large quarter-to-quarter variability of base growth that is a by-product of the Fed's operating procedures, but a smoothed version of the rule indicates that the signals that it prescribes are not themselves erratic.

In recent articles, the Economist has argued that more attention should be paid, in the conduct of monetary policy, to the behavior of monetary aggregates. We strongly agree, and also agree with the Economist that more should have been done during the Greenspan years to institutionalize monetary policy-making at the Fed, by adopting procedures more like those of leading inflation-targeting central banks. The demise of statistics on the measure M3 is not itself an alarming development, however. More importantly, we do not share the Economist's attraction to the notion that central banks should take actions to control asset-price movements that are distinct from fluctuations in current-activity price indexes (such as the CPI) and—to a limited extent—fluctuations in real output and/or employment measures.

References

- The Economist, "Special Report: Alan Greenspan," January 14, 2006, pp. 67-69. (a)
- _____, "The Missing Link," March 25, 2006. pp. 78-79. (b)
- _____, "Running on M3," March 25, 2006, p. 12. (c)
- Brunner, Karl, and Allan H. Meltzer, "Strategies and Tactics for Monetary Control,"
Carnegie-Rochester Conference Series on Public Policy 18 (Spring 1983), 59-104.
- Friedman, Milton, "Monetarism in Rhetoric and Practice" Bank of Japan Monetary and
Economic Studies 1 October 1983), 1-14.
- Goodfriend, Marvin, "The Phases of U.S. Monetary Policy: 1987 to 2001," Federal Reserve
Bank of Richmond Economic Quarterly 88:4 (Fall 2002), 1-17.
- McCallum, Bennett T., "Robustness Properties of a Rule for Monetary Policy," Carnegie-
Rochester Conference Series for Public Policy 29 (Autumn 1988), 173-203.
- _____, "Could a Monetary Base Rule Have Prevented the Great Depression?"
Journal of Monetary Economics 26 (August 1990), 3-26.
- _____, "Monetary Policy Rules and Financial Stability," in K. Sawamoto,
Z. Nakajima, and H. Taguchi, eds., Financial Stability in a Changing Environment.
Macmillan Press, 1995.
- _____, "Alternative Monetary Policy Rules: A Comparison with Historical
Settings for the United States, the United Kingdom, and Japan," Federal Reserve
Bank of Richmond Economic Quarterly 86 (Winter 2000), 49-79.
- _____, "The Use of Policy Rules in Monetary Policy Analysis," Shadow
Open Market Committee, November 18, 2002.

Taylor, John B., "Discretion Versus Policy Rules in Practice," Carnegie-Rochester Conference Series on Public Policy 39 (Nov. 1993), 195-214.

Tobin, James, "Monetary Policy: Rules, Targets, and Shocks," Journal of Money, Credit, and Banking 15 (November 1983), 506-518.