From Friedman to Taylor:
The Revival of Monetary Policy Rules in the 1990s

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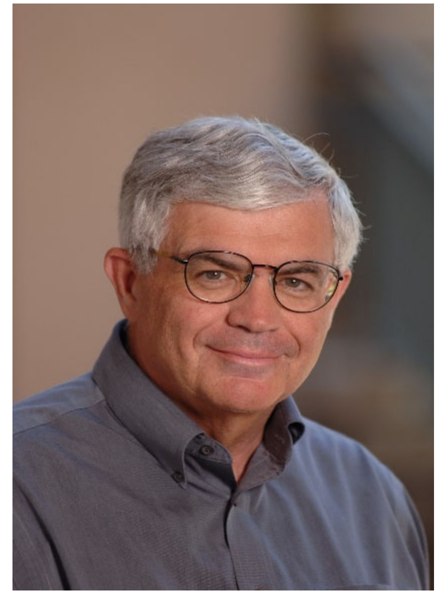
The Taylor rule and the revival of monetary policy rule analysis



- This talk will examine the revival that took place during the 1990s in the analysis of monetary policy rules—with the focus being on John Taylor's key role in this process.

- The part that Taylor played—most notably through his advancing the Taylor rule—is usefully viewed as one of building bridges between two traditions in monetary policy analysis.

The two traditions

- **A monetary policy rules tradition**, associated especially with Milton Friedman.
  - This tradition emphasized the benefits of policy rules, but it was also characterized by a highly negative attitude toward the short-term interest rate as a policy instrument.
- **An interest-rate-setting tradition**, long associated with central banks. This tradition had largely been reestablished at the Federal Reserve by the early 1990s. Correspondingly, in this period Alan Greenspan's Federal Open Market Committee made clear that its policy instrument was the federal funds rate.
  - In common with the rules approach that Friedman championed, this interest-rate-setting tradition was receptive toward focusing monetary policy on the pursuit of price stability.
  - But it viewed approaches centered on policy rules as imposing rigidity and as being antithetical to practical policymaking.

Milton Friedman's championing of monetary-growth rules

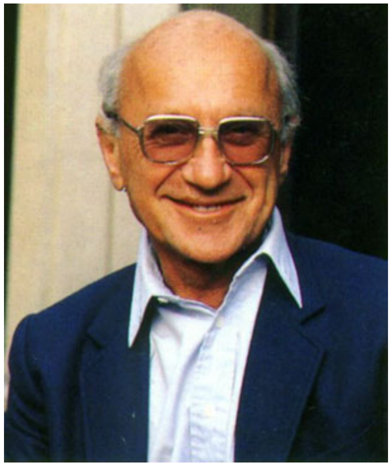
- In the 1970s and early 1980s, monetary policy rules were very strongly associated with the constant-monetary-growth rule, thanks especially Friedman's championing of that rule.
- As a part of this advocacy, Friedman made many public statements criticizing the use of short-term interest rates as a policy instrument.
- Including his 1976 observations that the Federal Reserve should "forget about interest rates" and that "monetary policy is not about interest rates; monetary policy is about the rate of growth of the quantity of money."
- The monetarist literature often implied that, in implementing inflation control, the central bank would inevitably have to focus on monetary aggregates.
- For example, Phillip Cagan (former Friedman student, & senior Columbia University colleague of John Taylor in the 1970s)—in 1979: "monetary policy has to rely very greatly on monetary aggregates… I really don't believe we can get away from that. As much as looking at interest rates may help, we have got to rely on the growth of financial assets."
- And Cagan (1982): "Monetary targeting is the only feasible method of stabilizing prices, whether one likes it or not."

Friedman's negative perspective on interest-rate policies

- Friedman's basis for favoring constant monetary growth did *not* amount to a contention that interest-rate rules were, on analytical grounds, inherently not viable.
- His position was, instead: An interest-rate policy aimed at price stability would require that the interest rate be adjusted vigorously in response to the state of the economy.
- He doubted whether such adjustment of the rate instrument would be successfully implemented.
- The nominal interest rate would need to be varied by in a manner that both (1) avoided real-rate movements that would produce prolonged swings in inflation and (2) generated real-rate movements when these promoted price stability.

Friedman on instrument choice

- Friedman was doubtful of authorities' scope to assess the necessary moves and then act promptly. He described the Federal Reserve from the mid-1960s to the late 1970s as "adjust[ing] its interest rate targets only slowly and belatedly."
- So he favored quantity targets—in particular, a simple rule of constant growth in the money stock, to be pursued using a quantity instrument, such as the monetary base or total reserves.



Taylor’s entry into debates on rules

- The rational expectations (RE) revolution provided a prism through which John Taylor looked at Friedman’s advocacy of a constant monetary growth rule.
- As an undergraduate in the 1960s, reason for Taylor’s interest in monetary policy rules evolved from the “philosophical reasons” outlined in *Capitalism and Freedom* to “operational reasons”—specifying monetary policy a dynamic macroeconomic model.
- Focus on rules intensified as he became a developer of dynamic RE models in the 1970s.
- In RE setting, it is seldom possible to lay out numerical values of the policy instrument and simply make these an exogenous input into the model. Rule (reaction function/law of motion for instrument) required.
- Taylor (1989, p. 186) therefore judged that the RE revolution “placed emphasis on evaluating macroeconomic policy as a rule.” He later recalled: “I would put it this way: In those kinds of models, you can’t really think about policy without a rule.”

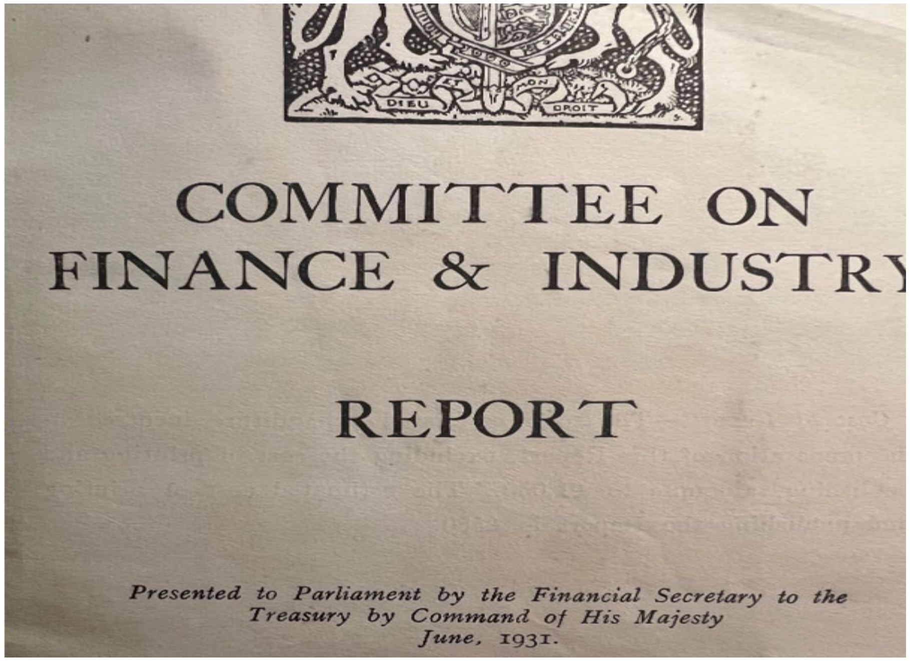
Taylor’s evolving posture on the instrument choice

- Taylor favored policy rules but was not an adherent to the constant-monetary-growth rule—preferring a rule that reacted to economic developments.
- Taylor’s preference for strategies that targeted final was evident in remarks delivered in Congressional testimony in June 1989, in his CEA confirmation hearing:

  > “The most important thing for the Federal Reserve and for the government in general to be thinking about is an aim to stabilize prices and keep inflation low in the United States, and that goal will lead to more growth and a healthier economic environment, if met.”

- Furthermore, Taylor shared the disaffection that many were having with the use of monetary or reserves aggregates in guiding monetary policy.
- Taylor over these years was reconsidering the appropriateness of a focus on quantity instruments and was turning instead to short-term interest rates as a candidate instrument.

The interest-rate tradition of central banks

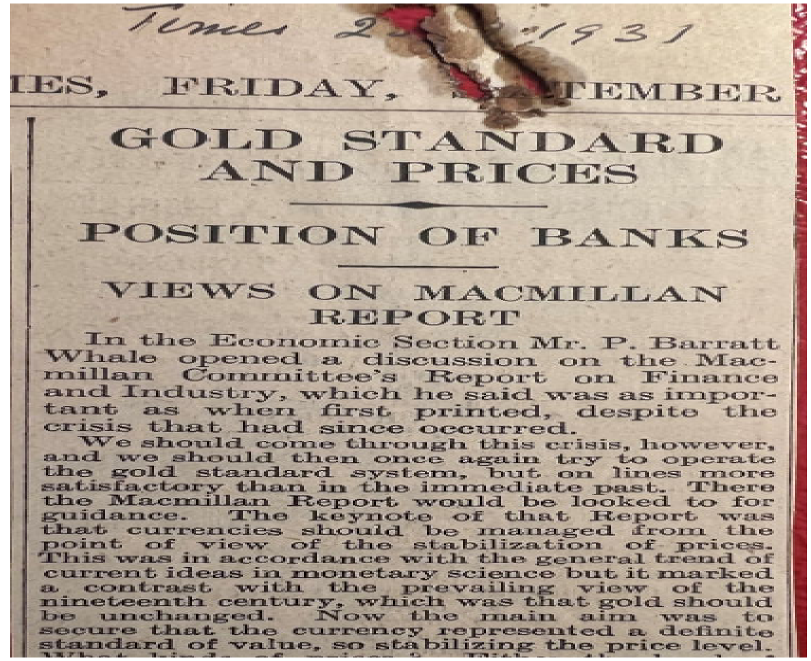


DIEU ET MON DROIT

COMMITTEE ON
FINANCE & INDUSTRY

REPORT

Presented to Parliament by the Financial Secretary to the Treasury by Command of His Majesty
June, 1931.



Times 2[illegible] 1931

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GOLD STANDARD
AND PRICES

POSITION OF BANKS

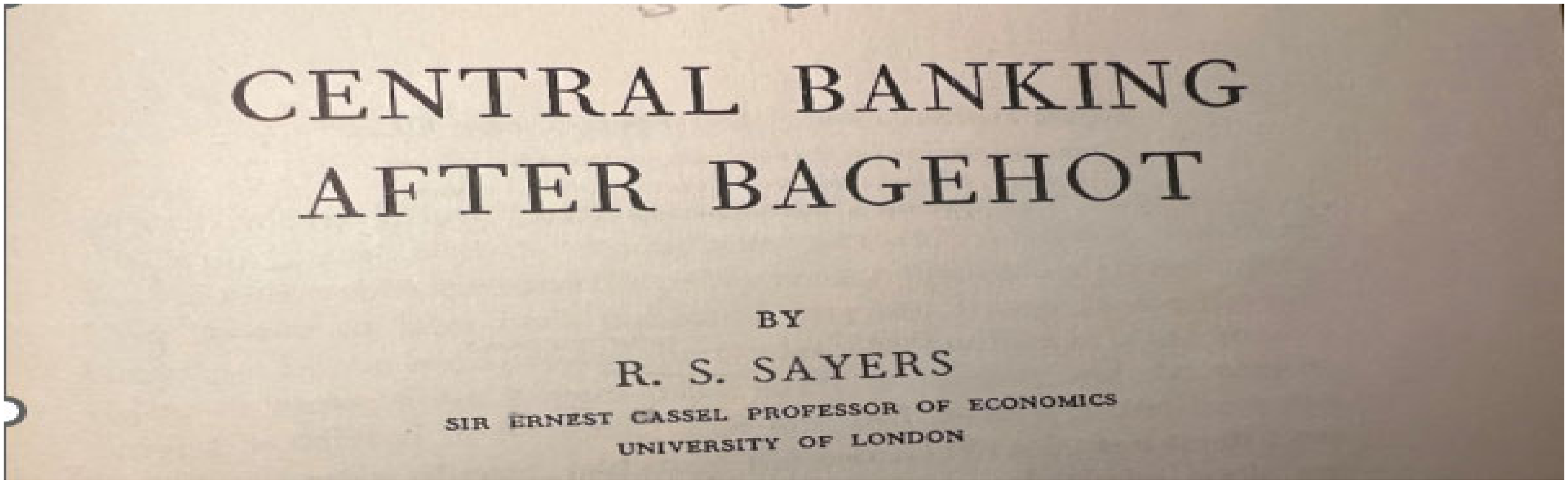
VIEWS ON MACMILLAN
REPORT

In the Economic Section Mr. P. Barratt Whale opened a discussion on the Macmillan Committee's Report on Finance and Industry, which he said was as important as when first printed, despite the crisis that had since occurred.

We should come through this crisis, however, and we should then once again try to operate the gold standard system, but on lines more satisfactory than in the immediate past. There the Macmillan Report would be looked to for guidance. The keynote of that Report was that currencies should be managed from the point of view of the stabilization of prices. This was in accordance with the general trend of current ideas in monetary science but it marked a contrast with the prevailing view of the nineteenth century, which was that gold should be unchanged. Now the main aim was to secure that the currency represented a definite standard of value, so stabilizing the price level.

- In gravitating toward an interest-rate reaction function, Taylor was in effect building bridges with a longstanding central bank tradition.
- The Macmillan Committee (U.K. government inquiry, 1931) had articulated this tradition: "Bank Rate policy is quite a proper instrument… for regulating the pace of expansion and enterprise at home and for putting pressure on costs."
- After the end of WWII rate-pegging policies, it was noted (Crick, 1956) of international practice: "variations in interest rates, brought about or furthered by action on the part of the central bank... [are] the old-established, 'classical' method of exerting authoritative influence on monetary conditions."

The anti-policy-rules tradition of central banks


CENTRAL BANKING AFTER BAGEHOT

BY

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- Those in central banking circles in the 1950s associated monetary policy strongly not only with interest-rate policies, but also with flexibility. They perceived this flexibility as essential and as making rule-based approaches inadmissible.
- Sayers (1957) referred to the use of interest-rate policy as “the return to a flexible monetary policy” and concluded a chapter on the theoretical basis of central banking by noting, “we must have central bankers to exercise a discretionary influence upon the monetary situation,” while lamenting the fact that “[e]ven in our own generation” there were advocates of rules—like Friedman.

The Federal Reserve's perspective on rules and interest rates through the 1980s

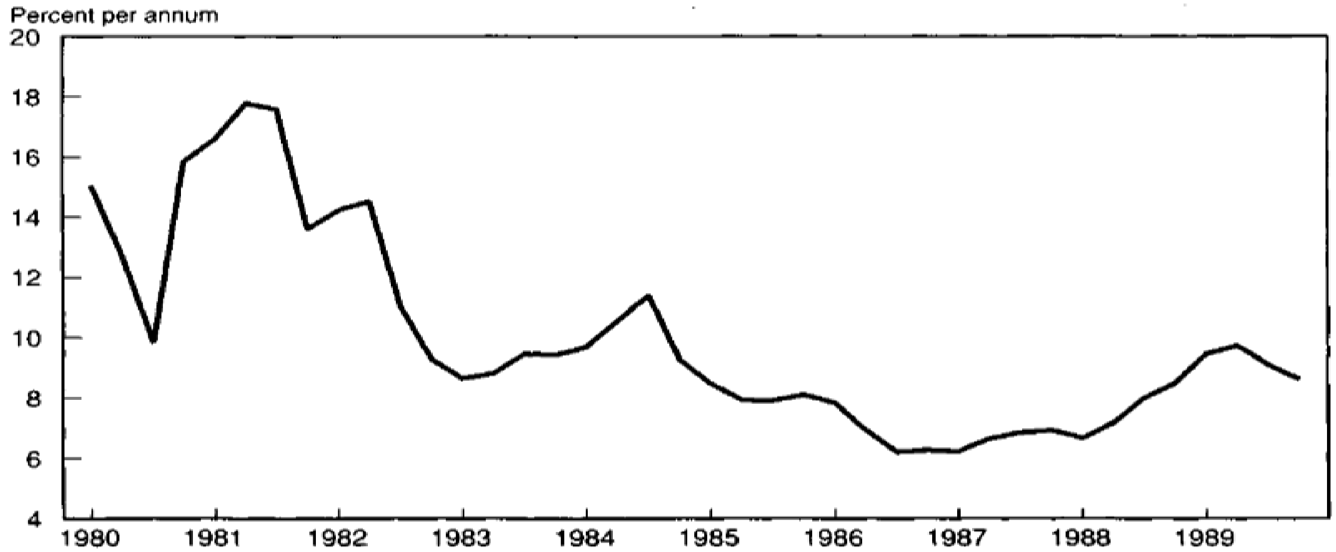
- Federal Reserve Chairs from Martin through Greenspan shared the skepticism about monetary policy rules associated with this central banking tradition.
  - Martin (1965): "It is doubtful… that anyone will ever be able to devise formulas that can provide infallible guides to monetary action."
  - Greenspan (December 1987): "If we could find particular indicators or fixed sets of rules which worked all the time, I would subscribe to that. The difficulty that we have is that we don't find such stabilities."
- As of the late 1980s, however, the Federal Reserve had a more ambivalent connection with central banking tradition regarding interest-rate management.
- Reluctance to be seen as determining U.S. interest rates, and criticisms of pre-1979 rate regime, had left the Federal Reserve entering the Greenspan era managing the federal funds rate but not being forthright about this in its public statements.

The Federal Reserve's reticence on interest rates, 1982–1990

Economic Report of the President 1990:

Chart 2-3

FEDERAL FUNDS RATE. Federal Reserve actions raised the Federal funds rate in 1988 and early 1989 but lowered it in the spring of 1989 as inflation pressures abated.



Note: Data are quarterly.
Source: Board of Governors of the Federal Reserve System.

- David Lindsey (former Friedman student as a senior Federal Reserve Board staff member over most of the Greenspan years) noted in November 1992 that the FOMC had 10 years earlier restored the interest rate as its policy instrument: "Since late 1982... sustained, sizable movements in the federal funds rate have been the result of discretionary ederal Reserve decisions."
- Nevertheless, during the Paul Volcker years, formal public acknowledgment of this management of the federal funds rate has been absent.

Volcker-era denials

- January 1983 Congressional testimony:

land.

Mr. VOLCKER. We have no interest rate policy, and no policy of maintaining interest rates at high levels. We would be delighted to

- Newspaper headline (August 1983):

Volcker denies Fed had any part in US interest rate rise

The Federal Reserve breaks cover on interest rates, 1990–1995

Federal Reserve Release

Press Release

Release Date: February 4, 1994

For immediate release

Chairman Alan Greenspan announced today that the Federal Open Market Committee decided to increase slightly the degree of pressure on reserve positions. The action is expected to be associated with a small increase in short-term money market interest rates.

The decision was taken to move toward a less accommodative stance in monetary policy in order to sustain and enhance the economic expansion.

Chairman Greenspan decided to announce this action immediately so as to avoid any misunderstanding of the Committee's purposes, given the fact that this is the first firming of reserve market conditions by the Committee since early 1989.

- The Federal Reserve in the years leading up to John Taylor's unveiling of the Taylor rule became more overt about its employment of the funds rate as its main policy instrument.
- Notably, in a July 1990 Congressional hearing, after he had referred to a recent policy "adjustment," Alan Greenspan was asked, "The adjustment you made was in lowering the federal funds rate, right?"—to which Greenspan replied, "Well—yes."
- These developments were followed, in the mid-1990s, by breakthroughs in FOMC communications. When the Committee raised the federal funds rate in February 1994, a press release accompanied the decision. 1995 releases added detail.

Prelude to the Taylor rule: early 1990s

NEW DIRECTIONS IN MONETARY POLICY RESEARCH:

COMMENTS ON THE FEDERAL RESERVE SYSTEM'S

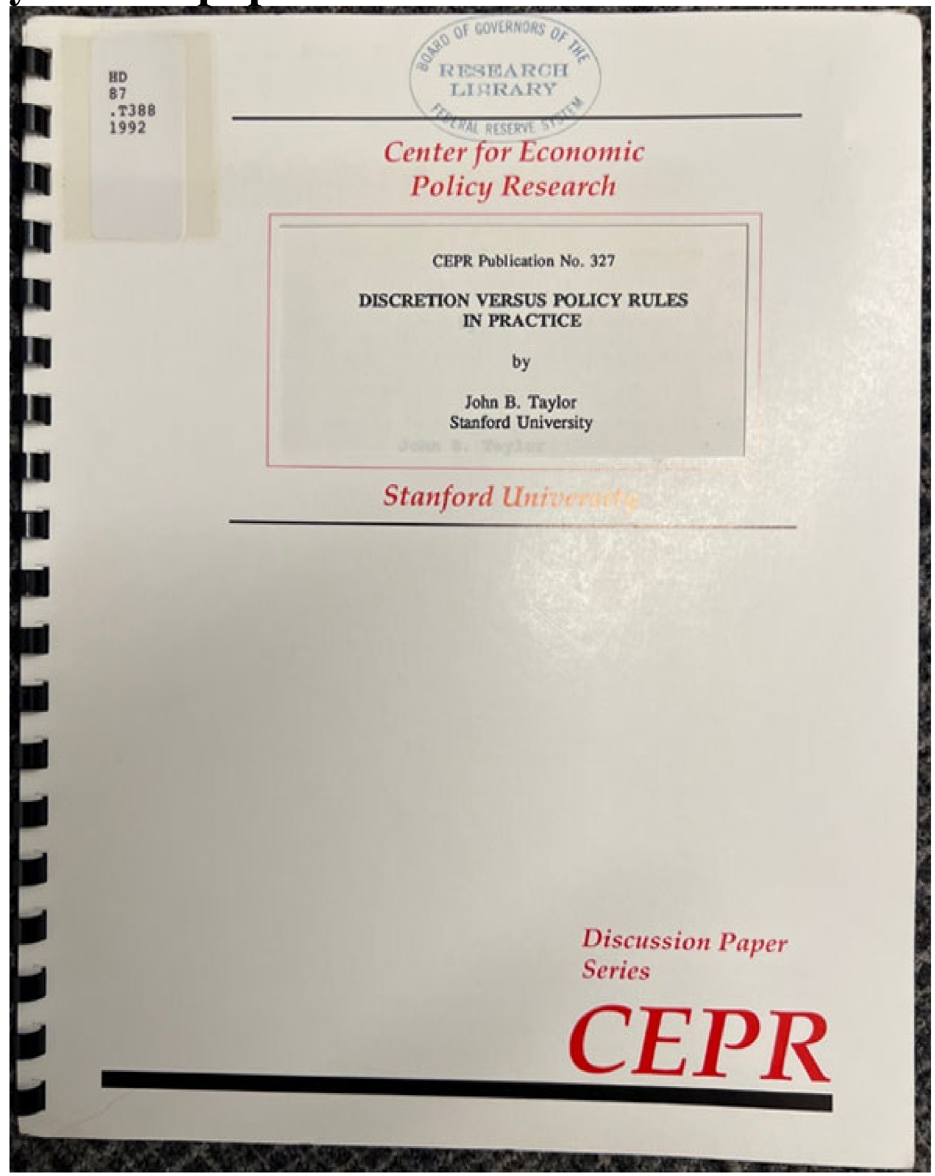
SPECIAL MEETING ON OPERATING PROCEDURES[1]

John B. Taylor[2]

- When at the CEA, Taylor included in the 1990 *Economic Report of the President* a passage that noted the Federal Reserve's setting of the funds rate.
- And, asked to summarize a June 1992 Federal Reserve conference on operating procedures, held at the Federal Reserve Bank of St. Louis, Taylor observed: "Almost every paper assumed that the interest rate rather than reserves was the immediate target variable for monetary policy."
- Also, Taylor participated in the project on rules and multi-country models (Bryant, Hooper, and Mann, 1993).

The Taylor rule paper

- Soon after this project's completion, both Taylor and Henderson and McKibbin (1993) presented related work.
- For Carnegie Rochester Conference in Pittsburgh (November 20–21, 1992).
- The rule that Taylor analyzed in that study—which was also released as a working paper in the same month of its first presentation—was stimulated by the prior project's cross-model comparisons of alternative rules.
- Several years later, Friedman remarked to Taylor, "I think it's almost impossible to predict what will be influential. You know that from your own work. You never dreamed when you presented the Taylor rule that it was going to become worldwide conventional wisdom."



Reinterpreting Greenspan's first five years as Chair

- Taylor found that his "example policy rule" characterized well the first five years of Alan Greenspan's tenure as head of the Federal Reserve.
- The rule cast new light on the verdict of Friedman and others (including Paul Samuelson) that monetary policy in the early 1990s had been too tight.
- A month before Taylor delivered his paper, Friedman had remarked: "the Fed has temporarily overshot. Continuation of M2 growth at 2 percent per year would imply actual deflation, not negligible inflation."
- Taylor suggested, instead, that monetary policy settings in the early 1990s had been broadly appropriate—and approximately in line with a long-run inflation objective of 2 percent.

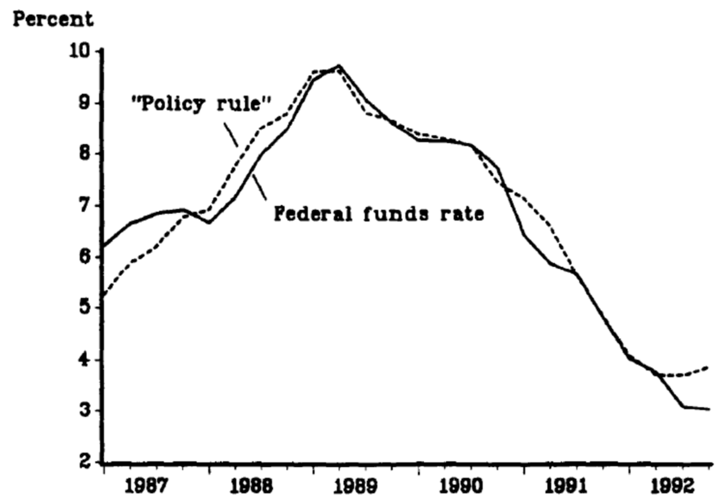


Figure 1. Federal funds rate and example policy rule.

The coefficients in the Taylor rule: inflation

look like. One policy rule that captures the spirit of the recent research and which is quite straightforward is:

$$r = p + .5y + .5(p - 2) + 2 \tag{1}$$

where

r is the federal funds rate,
p is the rate of inflation over the previous four quarters
y is the percent deviation of real GDP from a target.

- Coefficient of 1.5 on inflation.
- Taylor had observed that "the sluggishness of the interest rate targeting regime" was "a very significant lesson" flowing from monetarism (in particular, monetarism's critique of the interest rate as an instrument).
- His response of 1.5 to inflation was in part motivated by this lesson. The Taylor rule, like some of the rules considered in Leeper's (1991) theoretical study, therefore featured interest-rate responses that had what Michael Woodford (2001, 2003) would characterize as the "Taylor principle"—the idea that the appropriate response of the federal funds rate in the face of inflation overshoots should be greater than one-for-one.

The coefficients in the Taylor rule: the output gap

- The output-gap response was also a source of Friedman's reservations. Taylor would recall: "I think the notion of a rule he liked a lot. [But] I think he was very concerned about the gap. The measure of utilization was probably of the most concern to him." (John Taylor, interview, July 2, 2013.)
- The Taylor rule embodied a zero-output-gap target, in keeping with Taylor's (1988) earlier remark: "I like to think of the ideal policy rule as minimizing the deviations of real output from normal or natural levels, with a correction for inflation."
- This captured the message of the natural rate hypothesis (NRH). Directing monetary policy toward output-gap stabilization not an output level of policymakers' choice.
- Although the rule recognized the NRH, Friedman objected to having the output gap in the policy rule instead centered on the likelihood of measurement errors involving the output gap.
- The notion that monetary policy should refrain from responses to the level of the output gap had some support among those active in the late 1990s in the monetary policy research field—see, for example, McCallum (2001) and Orphanides (1999, 2003)—but was certainly a minority position among economists.

The rules literature revived

- Empirical studies of the reaction function largely confirmed that the Federal Reserve's average responses took the form that Taylor specified.
- Among these, Clarida, Galí, and Gertler's (2000) paper, "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory," found that the Taylor rule characterized both the Volcker and Greenspan regimes well, rather than just Greenspan's, with:
    - Dynamics (smoothing term; expected inflation rather than current inflation);
    - Larger responses (2.15 inflation, 0.93 output gap).
- CGG (2000, pp. 153, 157):

the degree of smoothing of interest rate changes.

Combining the partial adjustment equation (3) with the target model (1) yields the policy reaction function,

$$(4) \quad r_t = (1-\rho)\,[rr^* - (\beta - 1)\pi^* + \beta\pi_{t,k} + \gamma x_{t,q}] + \rho(L)\,r_{t-1} + \epsilon_t,$$

BASELINE ESTIMATES

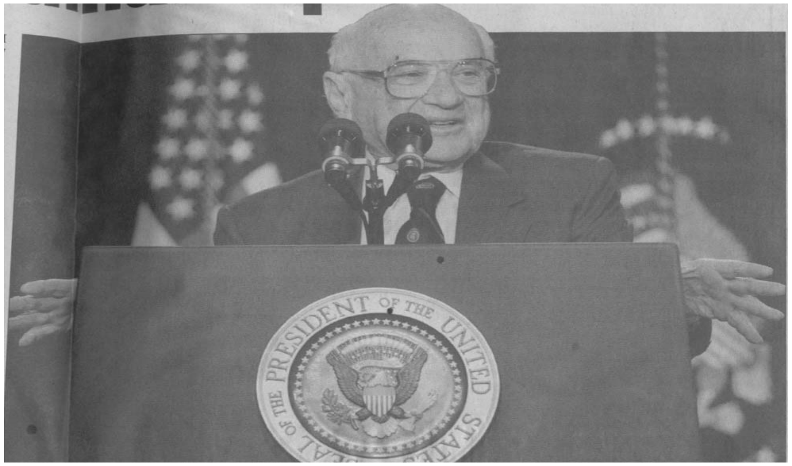
	π^*	β	γ	ρ
Pre-Volcker	4.24	0.83	0.27	0.68
	(1.09)	(0.07)	(0.08)	(0.05)
Volcker-Greenspan	3.58	2.15	0.93	0.79
	(0.50)	(0.40)	(0.42)	(0.04)

- Estimated interest-rate reaction functions showed that the response to inflation changed from below unity until the late 1970s to above unity thereafter.
- The agenda that the Taylor (1993) paper helped set over the decade after 1993 was felt in conference activity, including an NBER conference on monetary policy rules in January 1998, organized by Taylor (Taylor, 1999). The agenda was also reflected in the title of Chapter 1 of Michael Woodford's (2003) monograph *Interest and Prices*, "The Return of Monetary Rules."

The Greenspan Federal Reserve and the Taylor rule

- In September 1997, Alan Greenspan gave a speech specifically on policy rules. The occasion was a Stanford University event hosted by Taylor at which Greenspan was introduced by Friedman.
- Greenspan (1997) granted the "attractive features" of the Taylor rule. But he also underscored his view that "these types of formulations are at best 'guideposts' to help central banks, not inflexible rules that eliminate discretion" and stressed the need to estimate the (steady-state) equilibrium real federal funds rate and potential output as limitations of the rule's applicability.
- Greenspan also acknowledged the upsurge in activity in the area of policy rules that the Taylor rule had helped generate: Greenspan noted that the Taylor rule "has attracted widening interest in recent years in the financial markets, the academic community, and at central banks."
- Greenspan had come to describe interest-rate policy in reaction-function terms: "you can certainly assume that if we perceive that inflationary pressures are rising… we [will] respond to try to contain it." (*Monetary Policy Report* testimony, February 22, 1994.)
- The Taylor rule had also appeared in the briefing material provided by Federal Reserve Board staff for FOMC discussions starting in November 1995 (Kahn, 2012).

Milton Friedman: Not completely reconciled



- As for Milton Friedman, it remained the case that he was not completely won over.
- The adjustment of interest rates in response to the state of the economy still contrasted heavily with the leaving of the short-term interest rate to market forces that was implied by Friedman's ideal arrangement—the adoption of a reserves-based instrument.
- As Taylor had put it: "Some automaticity is lost when interest rates are targeted, at least in comparison with targeting quantities."
- Although Friedman was not fully reconciled to the Taylor rule, Taylor benefited from the extensive dialogue between them on the subject: "And we talked about that a lot, and I don't know if I completely convinced him, but that was, I think, a fruitful exchange for me, in seeing his reaction to that. I'd say that I think he generally was quite positive about it." (John Taylor, interview, July 2, 2013.)