

For release on delivery
1:30 p.m. EDT
October 10, 2023

Monetary Policy Analysis and the Development of Federal Reserve Policymaking

Remarks by

Christopher J. Waller

Member

Board of Governors of the Federal Reserve System

at

“The Legacy of Bennett McCallum and Lessons for Monetary Policy Today,” a conference
sponsored by
the Mercatus Center at George Mason University

Washington, D.C.

October 10, 2023

It is a pleasure to be here to honor the legacy of Bennett McCallum by discussing his work on monetary policy. Over the years, I was fortunate to cross paths with Ben several times—from when I was a young academic economist to when I was research director at the Federal Reserve Bank of St. Louis. But, like many of you, most of my exposure to Ben McCallum’s thinking has consisted of reading, and learning from, his writings on monetary policy.

Ben was an influential researcher who focused on a number of topics that are key to monetary policy, some of them highlighted in today’s panel sessions, including policy rules, instruments, and targets. When I was an academic, these were research interests that I shared with Ben. More recently, since I became a member of the Federal Open Market Committee (FOMC), the same issues have been at the forefront of my work, as I will explain in my remarks today.

I will cover these issues in the context of discussing broad developments in U.S. monetary policy over the past quarter-century.¹ In doing so, I’m motivated by McCallum’s 1999 paper “Recent Developments in Monetary Policy Analysis: The Roles of Theory and Evidence,” which was a review of the previous 25 years.² In my remarks, I’ll first talk about changes that have taken place since the 1990s in the way in which the FOMC has conducted policy. Then I’ll turn to a discussion of monetary policy rules, how Ben thought about them, their use as an input into policymakers’ decisions, and the choice of instruments and targets in policy rules.

¹ The views expressed here are my own and not necessarily those of my colleagues on the FOMC or the Board of Governors.

² See McCallum (1999b).

Developments in Monetary Policy from 1998 to 2023

McCallum's review, which was largely written in 1998, contrasted monetary policy analysis in 1973 and 1998. In 1973, many economies were adjusting to the demise of the Bretton Woods international monetary system, and their domestic monetary policy regimes were starting to develop alongside floating exchange rates as well as the first oil shock that materialized during that year. In the U.S., continued dissatisfaction with economic performance—particularly high inflation—led to the restrictive monetary policy implemented by Paul Volcker from 1979 to 1982. The disinflation delivered by this policy was followed by greatly improved overall economic performance in the period that came to be known as the Great Moderation. The Great Moderation was also associated, in the era of Alan Greenspan's leadership of the Federal Reserve, with inflation moving down further, to rates consistent with price stability.

Consequently, by the time of McCallum's 1998 retrospective, U.S. monetary policy had established a track record that was held in very high regard. It was widely believed that the Fed had lost credibility in the 1970s in terms of its willingness to fight inflation. Chairman Volcker's actions restored the Fed's credibility. Following the Volcker disinflation, economic research focused on the idea that monetary policy strategies would be fully effective only if they were credible. This idea led to an intensified debate about "rules versus discretion." The issue was how to maintain the basis for U.S. monetary policy that Volcker had created. As I'll discuss further, what was needed was a way to maintain the credibility of the institution, as opposed to relying on the credibility of an individual Fed Chair. One approach was for the FOMC to commit to

following a policy rule and explicit policy targets, combined with communication of its policy rule to the public. And this approach was a key aspect of Ben McCallum's work.

In the 25 years since 1998, there have been numerous changes in U.S. monetary policy arrangements. These have included several important reforms that were substantially along the lines advocated by Ben and others. In multiple ways, the FOMC's policy framework has become much more explicit. At the end of 2007, the FOMC began publishing a quarterly Summary of Economic Projections, collecting information on individual meeting participants' forecasts. Then, in January 2012, the FOMC issued a Statement on Longer-Run Goals and Monetary Policy Strategy—also known as our consensus statement. The consensus statement has been reaffirmed every year and revised several times. From its inception, it made the price-stability goal that is part of our congressional mandate more concrete by indicating that Federal Reserve policymakers interpret it as a 2 percent longer-run inflation rate (in the personal consumption expenditures price index). In 2011, Ben Bernanke initiated the practice of postmeeting press conferences, which under Chair Powell's leadership now follow every FOMC meeting.

In the summer of 2020, FOMC participants released a revised consensus statement that further elaborated their interpretation of the dual-mandate goals of maximum employment and price stability and how the Committee would pursue those objectives. The new statement explicitly recognized the policy tools of asset purchases and forward guidance on the federal funds rate. These tools were developed during the period, which started in late 2008, in which the federal funds rate was at the effective

lower bound (ELB), and they were used again during the new ELB episode that began in March 2020.

As many observers have noted over the years, the introduction of the 2 percent inflation objective and other formalizations of the Federal Reserve’s monetary policy framework actually took place well after disinflation had been achieved under Volcker and consolidated under Greenspan. It might be asked why—with price stability secured by around the mid-1990s—these formalizations were thought necessary. The answer lies in the fact that a well-understood monetary policy regime is needed to make price stability and anchored inflation expectations durable features of the economic environment.³ Communicating key characteristics of the regime—including the numerical inflation target and policymakers’ reaction function—makes it concrete and transparent in the eyes of the general public while also enhancing the central bank’s credibility and the effectiveness of monetary policy.

In this connection, the design of modern central bank policy regimes has drawn importantly on the literature on monetary policy rules. It is no coincidence that the period in the 1990s and 2000s of major strides in central bank transparency, frameworks, and communications took place alongside a resurgence of interest in research on monetary policy rules. The literature on monetary policy rules and on inflation targeting provided insights about how the U.S. monetary policy framework could achieve our dual-mandate goals of maximum employment and stable prices. And we have made use of those insights. By setting out a long-run inflation goal, while indicating that we take

³ Paul Volcker essentially recognized this point in congressional testimony of July 22, 1980, when he observed that “we want to have a firm monetary standard. . . [one that is] tied to the general stability of prices” (Volcker, 1980, p. 134).

maximum employment as a long-term variable largely determined by nonmonetary factors, we make clear that we do not view our mandate as licensing us to seek unsustainably high levels of real output through bouts of loose monetary policy. As the literature on time consistency shows, not only would such monetary policy looseness sacrifice the achievement of long-run price stability, it would also not even deliver higher output in the long run.⁴ Ben McCallum once summarized the consensus as follows: “The pragmatic argument for inflation targeting begins with the proposition that, from a long-run (i.e., steady state) perspective, monetary policy has a dominating influence on an economy’s (average) inflation rate and a negligible influence on its rate of unemployment or output relative to capacity. This proposition has wide support among central bankers and also within the academic community.”⁵

The benefits of an explicit, transparent policy regime are brought out clearly by our recent experience. When the FOMC began raising the federal funds rate in March 2022 to tame inflation, it used forward guidance to make clear our intention to reach a policy stance that is sufficiently restrictive to bring inflation back to 2 percent. I believe that this guidance has made our policy actions more effective.

The FOMC’s Reaction Function and the Analysis of Monetary Policy Rules

Forward guidance and the postmeeting statement are major means by which the FOMC is able to communicate to households, businesses, and financial markets key aspects of our reaction function. The reaction function connects decisions on our main

⁴ See Kydland and Prescott (1977) and Barro and Gordon (1983). As already indicated, the advent of explicit inflation targeting in several countries helped motivate the changes made to the Federal Reserve’s policy arrangements. But the adoption of inflation targeting abroad was itself partly driven by the analytical considerations that I am highlighting. For discussions of how the early practice of inflation targeting in various countries incorporated these considerations, see, for example, King (1997), Bernanke, Laubach, Mishkin, and Posen (1999), and Svensson (1999).

⁵ See McCallum (1997, p. 224).

policy instrument—the federal funds rate—to inflation and other key variables, such as data on labor market conditions.

The reaction function relates to a key research interest of Ben McCallum's: policy rules. Three key messages that McCallum stressed regarding rules have become widely accepted.

The first message is that rules can be countercyclical. McCallum became interested in policy rules at a time when those rules were closely associated with what is termed “nonactivist” policymaking—defined as approaches that did not involve the monetary authority responding to fluctuations in real variables such as output and employment. At that time, the research literature focused on what was known as the k percent rule, implying a fixed rate of growth for the money supply. This rule was intended to pin down the longer-run inflation rate, but it precluded monetary policy responses to the state of the business cycle. In contrast, McCallum, as well as other economists of his generation such as Stanley Fischer and John Taylor, argued that it was appropriate to consider both nonactivist policy rules and rules that were deliberately countercyclical or activist.⁶ A policy rule, according to this view, could respond to movements in output, employment, and inflation in a systematic way, using a formula intended to be applicable over time and in different circumstances.⁷ Today it is widely accepted by economists that monetary policy rules can be activist rules.

A second, related message of McCallum's work was that different rule specifications can concretely characterize differences among economists on appropriate monetary policy. In the 1970s, the whole notion of policy rules was closely associated

⁶ See Dornbusch and Fischer (1978, p. 290), Taylor (1980, pp. 31–32), and McCallum (1980, 1987).

⁷ See McCallum (1987, p. 416).

with advocates of monetarism and rational expectations, with Keynesian economics being seen as entailing opposition to policy rules. McCallum opposed this dichotomy and observed, “To me it seems quite clear that debates between economists—for example, Milton Friedman and James Tobin—are about the desirability of different policy rules.”⁸ That is, McCallum wanted to represent alternative perspectives on monetary policy as different rule specifications, and he urged the study of rules as a means of understanding various policy prescriptions and their consequences for the economy. This perspective on rules has also become standard. Indeed, the box on monetary policy rules that regularly appears in the Federal Reserve Board’s *Monetary Policy Report* provides a menu of policy rules designed to reflect a variety of views about the appropriate formulation of monetary policy.⁹ Similarly, multiple rule prescriptions and the possible implications of alternative rules for economic outcomes have, for many years, been a regular part of the briefing materials that go to policymakers before each FOMC meeting, allowing policymakers to incorporate these prescriptions into their thinking and discussions.¹⁰

A third message of McCallum’s work on rules was that there were merits in actual policy following “rule-like” behavior.¹¹ He recognized that policy rules were not likely to be used literally or mechanically as a means of deciding on monetary policy actions. Even so, McCallum believed that rules provided information about the responses to the state of the economy that were likely to be associated with more successful

⁸ See McCallum (1980, p. 725).

⁹ See, most recently, the box “Monetary Policy Rules in the Current Environment” in Board of Governors (2023, pp. 44–46).

¹⁰ Examples of such materials can be found in the publicly available Tealbooks (through 2017), which are provided on the Board’s website at https://www.federalreserve.gov/monetarypolicy/fomc_historical.htm.

¹¹ See McCallum (1980, 1999a).

policymaking. According to this reasoning, the prescriptions coming from policy rules provide valuable benchmarks. As McCallum put it, “Actual central banks are unlikely to officially adopt such rules, of course, but consideration of their implications could nevertheless prove helpful in practice.”¹²

McCallum also noted that this idea was strongly advanced by John Taylor in his 1993 paper introducing the Taylor rule.¹³ It’s worth looking at some features of the Taylor rule, as this will help bring out the connections between the policy rules literature and Federal Reserve practice. My discussion of these features will underline the fact that it is today widely accepted that the predictability of policymakers’ reaction function strengthens the stabilizing properties of monetary policy. In that sense, policymakers understand the value of making decisions in “rule-like” ways.

First, I will discuss the Taylor rule formula’s left-hand side—its specification of the instrument. I will then turn to its right-hand side—the target variables to which the instrument responds.

The Monetary Policy Instrument

As McCallum observed, “Taylor’s paper (1993) succeeded brilliantly in interesting central bankers in the consideration of rule-guided policy making.”¹⁴ In particular, Taylor’s article helped bring monetary policy research into better alignment with central bank practice in putting the focus squarely on interest rate rules. Much monetary policy analysis in academia had considered rules in which the policy instrument was a monetary or reserves aggregate. As I expect most of you know, this was a matter

¹² See McCallum (1993, p. 39).

¹³ See Taylor (1993).

¹⁴ See McCallum (1999b, p. 16).

on which McCallum's research had two branches. On the one hand, the rule that McCallum himself advanced in a number of papers in the 1980s and 1990s was a rule for the monetary base and was designed to improve on the k percent monetary-growth rule by introducing countercyclical responses and allowing for shifts in money demand.¹⁵ But, on the other hand, he also produced fundamental analytical work showing that interest rate rules were viable, with his 1981 paper establishing that such rules could provide an anchor on the economy's nominal variables.¹⁶ Consequently, McCallum was receptive when the Taylor rule became a baseline reaction function in monetary policy analysis.

Central banks were likewise receptive to the analysis of interest rate rules—and the Taylor rule in particular. Their favorable reaction was driven by two factors. First, after the experience of monetary targeting, central banks were disillusioned with policy analysis that was focused on monetary aggregates. Second, interest rate rules were policy relevant because these rules were expressed in terms of the short-term interest rate on which central banks actually made decisions. As McCallum put it, “The fact is that actual central banks in industrial countries conduct monetary policy in a manner that is much more accurately depicted by writing [the interest rate] as the instrument.”¹⁷

Reflecting this reality, all the rules considered in our *Monetary Policy Report* are interest rate rules.¹⁸

¹⁵ See, for example, McCallum (1987, 1993, 1999a).

¹⁶ This work was in response to the negative judgment made on interest rate rules by Sargent and Wallace (1975). See Woodford (2003, p. 45) and Cochrane (2023, p. 416) for discussions of McCallum's (1981) result in the context of dynamic general equilibrium analysis.

¹⁷ See McCallum (1999b, p. 24).

¹⁸ In addition, interest rate rules, largely consisting of variants of the Taylor rule, have been found useful in characterizing earlier eras of U.S. monetary policy. See Clarida, Galí, and Gertler (2000).

Monetary Policy Targets

An additional attraction of the Taylor rule is that the right-hand-side variables correspond closely to economic variables for which central banks have targets: inflation and an estimate of the state of real aggregate demand or labor market conditions. I'll make a few remarks about considerations related to these targets.

When it comes to the specification of the inflation term in a policy rule, in the U.S. case, it's important that the inflation target is consistent with our dual mandate, which includes a price-stability goal. In 1993, John Taylor suggested that a 2 percent inflation objective characterized the Federal Reserve's behavior in the early Greenspan years pretty well. This goal subsequently became official. In 2012, as I noted earlier, the Committee made a goal of 2 percent inflation its formal interpretation of the price-stability objective. The choice of a 2 percent longer-run goal reflected a broad consensus that this rate corresponded to effective price stability in the United States. Around the world, too, inflation-targeting central banks view 2 percent as the rate corresponding to price stability. The FOMC has further judged that 2 percent is the inflation goal most consistent with achievement of our dual mandate. We have reaffirmed this numerical goal repeatedly since 2012, and, in tightening monetary policy since early last year, we've made clear that we're determined to bring inflation down to 2 percent.

In considering the appropriate monetary policy response needed to return inflation to 2 percent, I find it useful to draw on the findings of the policy rules literature. These findings include the "Taylor principle" notion that deviations of inflation from target

should likely be met by a more than one-for-one response of the federal funds rate—a response that helps ensure that the real interest rate is increased in policy tightenings.¹⁹

The other part of our dual mandate is the goal of maximum employment. Reflecting the fact that this goal refers to the labor market rather than economic activity, the interest rate rules considered in the *Monetary Policy Report* put the real target in terms of an unemployment gap, rather than an output gap. On the matter of how this rule should be used as an input into policymaking, the main thing that I would stress is that there are multiple dimensions of labor market conditions, as well as considerable uncertainty about the level of maximum employment. As a result, caution is justified in having monetary policy responding to gap estimates. I therefore see merit in McCallum’s warning against monetary policy responding strongly to the output gap.²⁰ In this connection, Athanasios Orphanides’s research suggests that estimates of the first difference of economic slack (or excess demand pressure) may be less vulnerable to mismeasurement than the corresponding estimates of the level.²¹ These considerations imply that the prescriptions of the first-difference interest rate rule—which also appear in the *Monetary Policy Report*—serve as a useful crosscheck on the prescriptions of more standard variants of the Taylor rule.

Conclusion

Staying on the topic of policy targets, I think it is worth concluding by emphasizing an important respect in which things have *not* changed since 1998 when Ben

¹⁹ A detailed analysis of the Taylor principle appears in Woodford (2003). The Federal Reserve Board website has a discussion of the Taylor principle in the context of “Principles for the Conduct of Monetary Policy” (<https://www.federalreserve.gov/monetarypolicy/principles-for-the-conduct-of-monetary-policy.htm>).

²⁰ See McCallum (2001).

²¹ See, for example, Orphanides and Williams (2002) and Orphanides (2003).

McCallum reviewed monetary policy developments. He noted, “Overall, the most fundamental change since the 1970s has been the assumption of responsibility by central banks for performance in terms of inflation rates. In 1998, it would be extremely surprising to run across a central bank statement that discussed medium-term inflation prospects in a manner suggesting that these are unaffected by monetary policy behavior.”²² That difference between 1973 and 1998 is also an important contrast between 1973, when U.S. monetary policy failed to play the part that it needed to play in restoring price stability, and the FOMC’s behavior over the past two years. Price stability is a primary responsibility of the Federal Reserve. This is why we have taken forceful steps aimed at reducing inflation—and why we will stay on the job to achieve our objective.

²² See McCallum (1999b, p. 11).

References

- Barro, Robert J., and David B. Gordon (1983). "A Positive Theory of Monetary Policy in a Natural Rate Model," *Journal of Political Economy*, vol. 91 (August), pp. 589–610.
- Bernanke, Ben S., Thomas Laubach, Frederic S. Mishkin, and Adam S. Posen (1999). *Inflation Targeting: Lessons from the International Experience*. Princeton, N.J.: Princeton University Press.
- Board of Governors of the Federal Reserve System (2023). *Monetary Policy Report*. Washington: Board of Governors, June, https://www.federalreserve.gov/monetarypolicy/files/20230616_mprfullreport.pdf.
- Clarida, Richard, Jordi Galí, and Mark Gertler (2000). "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory," *Quarterly Journal of Economics*, vol. 115 (February), pp. 147–80.
- Cochrane, John H. (2023). *The Fiscal Theory of the Price Level*. Princeton, N.J.: Princeton University Press.
- Dornbusch, Rudiger, and Stanley Fischer (1978). *Macroeconomics*. New York: McGraw-Hill.
- King, Mervyn (1997). "Changes in UK Monetary Policy: Rules and Discretion in Practice," *Journal of Monetary Economics*, vol. 39 (June), pp. 81–97.
- Kydland, Finn E., and Edward C. Prescott (1977). "Rules Rather Than Discretion: The Inconsistency of Optimal Plans," *Journal of Political Economy*, vol. 85 (June), pp. 473–91.
- McCallum, Bennett T. (1980). "Rational Expectations and Macroeconomic Stabilization Policy: An Overview," *Journal of Money, Credit and Banking*, vol. 12 (November, Part 2), pp. 716–46.
- (1981). "Price Level Determinacy with an Interest Rate Policy Rule and Rational Expectations," *Journal of Monetary Economics*, vol. 8 (November), pp. 319–29.
- (1987). "The Case for Rules in the Conduct of Monetary Policy: A Concrete Example," *Weltwirtschaftliches Archiv*, vol. 123 (3), pp. 415–29.
- (1993). "Specification and Analysis of a Monetary Policy Rule for Japan," *Bank of Japan Monetary and Economic Studies*, vol. 11 (November), pp. 1–45.
- (1997). "Inflation Targeting in Canada, New Zealand, Sweden, the United Kingdom, and in General," in Iwao Kuroda, ed., *Towards More Effective Monetary Policy*. New York: St. Martin's Press, pp. 211–41.

- (1999a). “Issues in the Design of Monetary Policy Rules,” in John B. Taylor and Michael Woodford, eds., *Handbook of Macroeconomics*, vol. 1C. Amsterdam: Elsevier, pp. 1483–530.
- (1999b). “Recent Developments in Monetary Policy Analysis: The Roles of Theory and Evidence,” NBER Working Paper Series 7088. Cambridge, Mass.: National Bureau of Economic Research, April, https://www.nber.org/system/files/working_papers/w7088/w7088.pdf.
- (2001). “Should Monetary Policy Respond Strongly to Output Gaps?” *American Economic Review*, vol. 91 (May, Papers and Proceedings), pp. 258–62.
- Orphanides, Athanasios (2003). “The Quest for Prosperity without Inflation,” *Journal of Monetary Economics*, vol. 50 (April), pp. 633–63.
- Orphanides, Athanasios, and John C. Williams (2002). “Robust Monetary Policy Rules with Unknown Natural Rates,” *Brookings Papers on Economic Activity*, vol. 33 (2), pp. 63–118.
- Sargent, Thomas J., and Neil A. Wallace (1975). “‘Rational’ Expectations, the Optimal Monetary Instrument, and the Optimal Money Supply Rule,” *Journal of Political Economy*, vol. 83 (April), pp. 241–54.
- Svensson, Lars E.O. (1999). “Inflation Targeting as a Monetary Policy Rule,” *Journal of Monetary Economics*, vol. 43 (June), pp. 607–54.
- Taylor, John B. (1980). “Recent Developments in the Theory of Stabilization Policy,” in Laurence H. Meyer, ed., *Stabilization Policies: Lessons from the '70s and Implications for the '80s*, proceedings of the fourth annual conference cosponsored by the Federal Reserve Bank of St. Louis and the Center for the Study of American Business at Washington University. St. Louis: Federal Reserve Bank of St. Louis, pp. 1–40, available at <https://research.stlouisfed.org/publications/review/1980/04/01/recent-developments-in-the-theory-of-stabilization-policy>.
- (1993). “Discretion versus Policy Rules in Practice,” *Carnegie-Rochester Conference Series on Public Policy*, vol. 39 (December), pp. 195–214.
- Volcker, Paul A. (1980). “Statement [and testimony] of Paul A. Volcker, Chairman, Board of Governors of the Federal Reserve System,” in *Federal Reserve’s Second Monetary Policy Report for 1980, hearings before the Committee on Banking, Housing, and Urban Affairs*, U.S. Senate, July 22, 1980, 96 Cong. Washington: Government Printing Office, pp. 96–141.
- Woodford, Michael (2003). *Interest and Prices: Foundations of a Theory of Monetary Policy*. Princeton, N.J.: Princeton University Press.