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Economic Uncertainty and the Evolution of Monetary Policymaking

Remarks by

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Thank you, Matteo. It is my pleasure to welcome you to the 13th International Research Forum on Monetary Policy. The vibrant discussions you will engage in at this conference, and your research more broadly, will help us to understand better the origins and implications of uncertainty. I became a member of the Federal Reserve Board just as it was grappling with the economic after-effects of the pandemic, a once-in-a-century disturbance of worldwide significance. As a result, I know from firsthand experience that understanding the main sources of uncertainty and how best to make monetary policy decisions in the presence of uncertainty are crucial to policymaking.

I will take this opportunity to do a couple of things. First, I will review a few historical examples of how economic thinking on monetary policymaking in the presence of uncertainty has evolved. Second, I will consider lessons learned from these examples that could influence how monetary policymakers think about the policy choices the Federal Open Market Committee (FOMC) faces currently.[1]

The 1960s to the 1980s

In the 1960s, during the heyday of Keynesian macroeconomics, researchers widely believed that monetary policymakers faced a long-run tradeoff between inflation and unemployment, and that the tradeoff could be calibrated to keep unemployment indefinitely low at an acceptable cost in terms of higher inflation. Improvements in econometric modeling abounded, and the harnessing of *optimal-control* methods developed in the field of engineering held out the prospect that business cycle fluctuations could be stabilized.

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[1] The views expressed here are my own and are not necessarily those of my colleagues on the Federal Reserve Board or the Federal Open Market Committee.

There were contrarians, of course, most notably Milton Friedman, who highlighted the necessity of monetary policymakers to consider what they *don't* know in their decisionmaking process (Friedman, 1968). Friedman's statement that monetary policy works with "long and variable lags" was, among other things, an argument against policymakers trying to fine-tune the level of economic activity. In recognition of policymakers' limited knowledge of short-run economic relationships, Friedman advocated the use of simple rules for monetary policy, such as the *k*-percent money growth rule. He argued that rules that focused on monetary growth and that eschewed direct feedback on macroeconomic variables would work reasonably well, on average, and avoid the hubris of fine-tuning policy in a dynamic and uncertain world.

History proved Friedman right in his take on the importance of uncertainty, even if his prescription of a *k*-percent money growth rule fared less well.

During roughly the same period when Friedman authored his famous presidential address to the American Economic Association disputing the purported long-run tradeoff between inflation and unemployment, William Brainard published an influential paper on the implications of uncertainty. Brainard (1967) argued that uncertainty about the power of monetary policy implied that policy should respond more cautiously to shocks than would be the case if this uncertainty did not exist. Brainard's *attenuation principle* is a classic example of what is today known as the Bayesian approach to uncertainty.[2] The Brainard approach to uncertainty consisted of two steps. The first step is to compute the optimal policy for a world without uncertainty; that is, the *certainty equivalence* case.

[2] For example, in 1998, Alan Blinder wrote that the Brainard result was "never far from my mind when I occupied the Vice Chairman's office at the Federal Reserve. In my view . . . a little stodginess at the central bank is entirely appropriate" (Blinder, 1998, p. 12).

The second step is to adjust that policy response to account for the particular uncertainty under study. One strand of research followed these steps through the 1970s and beyond.[3] A parallel strand of research that embraced at least part of the message of Friedman was also under way. It bypassed the optimal policy benchmark altogether, on the grounds that uncertainty is pervasive, and sought instead to find simple rules that performed well across a large class of models and for a large range of conditions.

Brainard's insight was important. There are many circumstances in which the principle of gradualism applies, but as I will discuss later, economic research has also found that there are circumstances in which the presence of uncertainty does not warrant a gradual policy response.

The 1990s and 2000s

Jumping ahead to the 1990s, a "new economy" was emerging. The unemployment rate was below what many analysts at the time judged to be its natural rate, and many FOMC participants and others were forecasting growth above the economy's potential. Chairman Alan Greenspan, however, suspected that technological advances and other forces were fostering a "new economy" of sustained high productivity growth that would allow a period of persistently low unemployment without generating inflationary pressure. In the absence of hard evidence to the contrary, he was able to persuade the FOMC to go along with him by implicitly employing the Bayesian logic of Brainard's attenuation principle with a disarmingly simple suggestion: Let's just wait one more meeting and see. Chairman Greenspan repeated this message as inflation fell

[3] An incomplete list of the early contributions includes Prescott (1972), Chow (1976), Craine and Havenner (1977), and Kendrick (1982).

from above 2 percent in 1996 to below 2 percent in 1997 and 1998 while the economy added 9.3 million jobs, and the FOMC raised the federal funds rate just once.[4]

Around the same time, there was an explosion of interest in *simple policy rules* for monetary policy, beginning, in most people's reckoning, with the rule John Taylor (1993) published in the early 1990s. These simple feedback rules, which specify how central banks' policy instrument would respond to the state of the economy, differed from their predecessors by replacing monetary aggregates as the instrument of monetary policy with a short-term policy interest rate. This research embraced the message that restricting feedback to a small number of key macroeconomic variables would result in more robust outcomes than adhering to the prescriptions of, say, optimal-control policies, which in essence imposed feedback on all aspects of these models.[5] Whether much of the robustness gains of simple rules can be realized when central banks only use such rules as "guides" for monetary policy is a topic worthy of further research.[6]

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[4] The estimate of 9.3 million jobs uses total nonfarm seasonally adjusted numbers from the St. Louis Fed FRED database (https://fred.stlouisfed.org; PAYEMS series) and takes the difference between the December 1998 and January 1996 numbers.

[5] Optimal-control policies are optimal conditional on the structure of the model to which they are applied. Provided the model is a reliable approximation of the true economy, and policymakers' preferences are correctly specified, the policy prescriptions derived from optimal-control exercises are, by definition, the best that can be achieved. However, the underlying assumptions are stringent in many applications. There is also a literature on risk-adjusted optimal control dating back at least to Whittle (1981). See Taylor and Williams (2010) and references therein for a detailed argument on the efficacy of simple rules as hedges against model misspecification. Svensson (2003) is a critique of the use of all simple monetary policy rules—sometimes referred to as *instrument rules*—as opposed to what are called *targeting rules*.
In a 2012 speech, then Vice Chair Janet Yellen observed, "In evaluating the stance of policy, I find the prescriptions from simple policy rules a logical starting point" (Yellen, 2012). She went on to argue that simple rules "by no means deserve the 'last word'" on guidance for monetary policy, in part because they do not fully account for factors that might be idiosyncratic, such as risk-management concerns. That speech introduced the Fed's optimal-control simulations to the public as an alternative source of guidance for monetary policy that could be used alongside that of simple monetary policy rules, together with judgment. Since 2017, the *Monetary Policy Report* has discussed simple monetary policy rules and their limitations.

[6] Nikolosko-Rzhevskyy, Papell, and Prodan (2014), among others, explore this question.

The claimed robustness of simple rules across a set of fixed models is arguably only part of their appeal. Another part is the notion that their parsimony presumably makes simple rules relatively easy for households, businesses, and financial market participants to learn. One useful finding was that gradualism in policy setting, in the form of a sizable weight on the lagged policy rate in the policy rule, is helpful for facilitating learnability.[7] In any event, the literature on learning in macroeconomics extended the dimension of uncertainty for monetary policymakers from the cross section of candidate models to the time dimension of any given model.

The bulk of the early literature assumed private-sector decisionmakers were knowledgeable, rational agents, while policymakers lacked detailed knowledge of the structure of the economy. The assumed imbalance of information and knowledge was striking. It was usually assumed, sometimes only implicitly, that private agents understood not only the economic environment in which they operated, but also the policy regime that was in place. Considering this background, some more recent contributions explored two related departures from the assumption of a fixed model with uncertain parameters: time-variation in the true (population) model, and private agents learning about the economy.

As I just observed, the rational expectations paradigm presupposes that economic agents have a great deal of knowledge about their environment, but policymakers do not know the true (population) parameters of the models they use. Instead, they must use

[7] By "learnable" I mean in the sense that least-squares learning would converge, in the limit, on rational expectations equilibrium. See Evans and Honkapohja (2001) for a textbook treatment of learning in macroeconomics. Bullard and Mitra (2002) established the benefits of inertia in monetary policy for making a wider set of models "E-stable," meaning the process of least-squares learning leads to a unique and stable equilibrium. Tetlow and von zur Muehlen (2009) broadened that conclusion to a wider set of learning rules.

estimates of those parameters. As Sargent (1993) noted, it makes sense to assume that the decisionmakers within the models that policymakers employ are no more sophisticated than the econometricians who estimate them. Doing so means accepting that the true (population) parameters of one's model could be time varying—the outcome of the interplay between shocks, uncertainty, learning, and policy. That realization changes the way you think about monetary policy.

How might this matter? Let me give you one example. As many of you know, econometricians have found sizable declines in recent decades in the response of inflation to the unemployment rate.[8] Taken at face value, these declines in the slope of the Phillips curve have important implications for the optimal conduct of monetary policy. But what should policymakers take from such econometric results? Some researchers argue that the apparent decline in the response to slack in the Phillips curve could be a manifestation of the improved control of inflation by the central bank.[9] That is, policymakers could be "victims of their own success" in the sense that good performance in controlling inflation over the Great Moderation period may have weakened the information content of the data.

Now, take this notion a step further, as a strand of the literature does, and suppose that private agents within our models are themselves skeptical—that is, that they have doubts about their methods for formulating expectations and making decisions, and that they act accordingly. Economists now have new means of modeling uncertainty both *within* a given model and *across* a set of rival models. These methods draw on theories

[8] See, for example, Stock and Watson (2021) for time-series evidence and Smith, Timmermann, and Wright (2023) for panel data results.
[9] See, for example, Bullard (2018) for a demonstration and McLeay and Tenreyo (2019) for a detailed argument along these lines.

of *ambiguity aversion*.[10] Under ambiguity aversion, agents are particularly concerned about types of uncertainties that do not lend themselves to being represented in terms of probabilities. Agents' choices are motivated, in part, by an incentive to minimize the adverse consequences of these types of uncertainties. The ambiguity aversion approach to uncertainty suggests that to protect against uncertainty over which a policymaker is unwilling or unable to attach prior probabilities, the appropriate response is often anti-attenuation; that is, policy should apply *stronger* monetary medicine than in the certainty equivalence case.

For the reasons I have outlined, there are circumstances when uncertainty might appropriately induce a gradual response and other circumstances when a nongradual response to uncertainty may be justified. Furthermore, under either the Bayesian approach or the ambiguity aversion approach, the best response to uncertainty is context specific and can vary over time.[11] Sometimes the context leads to the same conclusion, broadly speaking, regardless of the approach. One case of perennial interest to central bankers is inflation persistence where the Bayesian approach, the ambiguity aversion approach, and its close cousin, robust control, all tend to lead to policy that is stronger than the certainty equivalent case to forestall the possibility of inflationary forces becoming embedded in inflation expectations.[12] Another case is that of crisis periods.

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[10] The literature on robust control in economics (for example, Hansen and Sargent, 2008) began with the normative case of how policymakers might address their doubts. The literature on ambiguity aversion (for example, Epstein and Schneider, 2003) had agents within models confront their doubts in making decisions. Works at the intersection of these two strands of the literature expand the concept of uncertainty (in the sense of Knight, 1921) in a micro-founded manner and relax the rational expectations hypothesis in a disciplined way. See, for example, Hansen and Sargent (2021).

[11] See Barlevy (2011) for an accessible survey and Tetlow and von zur Muehlen (2001) for a more technical treatment.

[12] Söderstöm (2002) establishes the result for the Bayesian case. Tetlow (2019) is a simple demonstration of that case alongside an ambiguity aversion case. With uncertain inflation persistence, the Bayesian and

The Global Financial Crisis

Take, for example, the Global Financial Crisis of 2008. During this period, the tension between caution, on the one hand, and vigorous action, on the other, as a way to conduct monetary policy in the face of uncertainty was evident. In September 2007, the FOMC decided to lower its target for the federal funds rate by 50 basis points to "forestall some of the adverse effects on the broader economy that might otherwise arise from the disruptions in financial markets" and noted that "developments in financial markets since the Committee's last regular meeting have increased the uncertainty surrounding the economic outlook."[13] In subsequent meetings, the FOMC gradually lowered its target for the federal funds rate by 25 basis points and, in January 2008, decided to quicken its pace by lowering the target by 75 basis points in an unscheduled meeting and by 50 basis points, 75 basis points, and 25 basis points in subsequent meetings. Inflation, however, was rising over that period. By June 2008, it was well over 2 percent and still increasing, and the FOMC paused its rate cutting. It was a decision that weighed the upside risks to inflation and inflation expectations with the downside risks to economic growth.[14] In September 2008, the circumstances changed

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ambiguity aversion approaches lead to a policy that is stronger than the certainty equivalent case because a symmetric distribution for inflation persistence results in asymmetric (downward-skewed) distributions for economic outcomes when evaluated for the certainty equivalent policy. Adam and Woodford (2012) show that uncertainty regarding the data generating process for inflation in the New Keynesian model retains as the optimal policy the same general form as in the standard model but with a more aggressive response to inflation.

[13] See paragraphs 2 and 4 of the September 2007 FOMC statement, which is available on the Federal Reserve Board's website at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm.

[14] See paragraph 4 of the June 2008 FOMC statement, which, in explaining the FOMC's decision to keep its target for the federal funds rate at 2 percent at that meeting, noted, "Although downside risks to growth remain, they appear to have diminished somewhat, and the upside risks to inflation and inflation expectations have increased." See also the minutes of the June 24–25, 2008, FOMC Meeting, in particular the summary of the Committee's discussion on downside risks to growth and upside risks to inflation on pages 7 and 8. Both documents are available on the Federal Reserve Board's website at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm.

precipitously, as did the FOMC's approach to policy. The Committee quickly cut the federal funds rate effectively to zero and took extraordinary steps to stabilize the financial system and support the economy. The motivation to respond assertively to the emerging crisis, and the uncertainty surrounding it, was no doubt accentuated by the knowledge that future policy actions might be circumscribed by a lengthy spell of the funds rate at its lower bound, which would magnify losses associated with adverse outcomes.[15] My conclusion, as Chair Powell mentioned in a speech in 2018, is that during crisis periods, words like "we will do whatever it takes" will likely be more effective than "we will take cautious steps."[16]

Lessons Learned

Some clear lessons flow from the history that I have summarized. First, when uncertainty is high, policymakers should sometimes act quickly and should sometimes act cautiously. The right action depends on the circumstances. Second, while simple monetary policy rules are appealing for several reasons, rigid adherence to the prescriptions of simple rules is unwarranted. Historically, policymakers have only used rules as "guides" or benchmarks in setting policy, and there are good reasons for this. It is clearly beneficial to look at the totality of the data to identify changes in the economy in real time, to embrace the risk-management considerations associated with uncertainty that factor into FOMC decisions, and to adapt policy to the evolution of the economy. Third, in the presence of a high degree of uncertainly, policymakers benefit from a

[15] The literature on the implications of the effective lower bound on nominal interest rates for the conduct on monetary policy is large and includes Reifschneider and Williams (2000).
[16] See Powell (2018).

healthy dose of humility. There are limits to what we know about the economy, especially after periods of economic upheaval such as a pandemic.

Current Situation

Reflecting on the situation we are facing today, over the past year, inflation has come down significantly but is still running above the FOMC's 2 percent goal. In March, headline personal consumption expenditures (PCE) inflation was 2.7 percent over the past 12 months based on the Federal Reserve's staff estimates. A year earlier, it was 4.4 percent. Core PCE inflation, which excludes the volatile food and energy components, stood at 2.8 percent; a year ago, it was 4.8 percent. While we have seen considerable progress in lowering inflation, the job of sustainably restoring 2 percent inflation is not yet done.

Real GDP growth in the fourth quarter of 2023 was 3.4 percent, and I expect first-quarter economic growth to slow down but remain solid as indicated by the solid growth in retail sales in March and February. Recent readings on both job gains and inflation have come in higher than expected. The economy added an average of 276,000 nonfarm jobs per month in the three months through March, a faster pace than we have seen since last March. And the inflation data over the past three months were above the low readings in the second half of last year.

My baseline outlook continues to be that inflation will decline further, with the policy rate held steady at its current level, and that the labor market will remain strong, with labor demand and supply continuing to rebalance. Of course, the outlook is still quite uncertain, and if incoming data suggest that inflation is more persistent than I

currently expect it to be, it will be appropriate to hold in place the current restrictive stance of policy for longer. I am fully committed to getting inflation back to 2 percent.

Conclusion

I would like to conclude by saying that in this environment of heightened uncertainty, it is increasingly important to comprehend what is driving uncertainty and how monetary policy might play a role in limiting the negative impact of uncertainty on businesses, households, and financial markets. Many of you in this audience have devoted a considerable amount of time to understanding the intricate link between uncertainty and economic outcomes. Your work has enriched our collective knowledge and has been instrumental in helping us policymakers understand the complexities of our decisions. Please keep it up!

Thank you.

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