Policymaker Roundtable
Federal Reserve Bank of Dallas Conference: "John Taylor's Contributions to Monetary Theory and Policy"
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I would like to add my voice to the chorus in thanking President Fisher and the Dallas Fed for hosting this conference honoring John Taylor.[1] It is a particular pleasure to have been invited to join this distinguished panel and to have this opportunity to discuss some of John Taylor's many important contributions to economics and monetary policy. In looking back at his work, I am struck by how thoroughly his research has affected the way policymakers and economists analyze the economy and approach monetary policy. His influence and, indeed, his name is heard whenever people talk about monetary policy, whether it's the Taylor Curve, the Taylor Principle, or, of course, the Taylor Rule. I'm told that an unwary indexer once even credited him with the Taylor expansion that we all learned in our calculus classes—something that surely made Brook Taylor spin in his grave.

I'll focus my comments today on the aspects of John Taylor's research that have shaped the discussion of monetary policy issues at the Federal Reserve and at central banks around the world. In so doing, I admit to giving short shrift to John's many other contributions, but I have only so much time! I have divided John's contributions to monetary policy into three branches: analyzing nominal rigidities, modeling the global economy, and developing principles of monetary policy.

[1] I am deeply grateful to John Williams for outstanding assistance in the preparation of these remarks.

To start with, it's useful to go back to the debates raging in macroeconomic theory in the 1970s when John began his research. Recall that at that time, and through the 1980s, many models incorporating rational expectations had the feature that predictable monetary policy actions would have no effect on the real economy. This result led many economists to criticize the Fed's dual mandate of price stability and maximum growth on the grounds that efforts at macroeconomic stabilization using monetary policy were at best ineffective and potentially destabilizing if "surprise" inflations were used to boost the economy. Accordingly, the policy recommendation was that central banks should focus exclusively on maintaining price stability and abandon all efforts at taming the business cycle.

Much of this literature assumed that prices and wages were completely flexible, adjusting day by day to changing economic conditions. John Taylor and several others challenged this assumption and the corresponding conclusion that rational expectations implied monetary policy irrelevance and the need to ignore output stabilization. His paper with Ned Phelps (1977) showed that even under rational expectations, if prices or wages are sticky, systematic monetary policy had real effects and could be used to stabilize fluctuations in real output.[2]

In a later paper (Taylor 1979), John showed that central banks face a tradeoff in terms of the magnitude of fluctuations in inflation and output. This result became enshrined in what is now commonly known as the Taylor curve, which plots out the frontier of the feasible set of outcomes in terms of the variances of inflation and the output gap. Importantly, the Taylor Curve is entirely consistent with the Fed's dual mandate—the twin goals of stabilizing inflation and output—in the face of a short-run

[2] See also Fischer (1977).

tradeoff in achieving them. Nowadays, discussions of monetary policy strategy are often boiled down to "picking a point on the Taylor Curve."

John's research showed that nominal rigidities were not merely a theoretical possibility, but were a feature of the actual economy. He developed and estimated his now-famous model of staggered nominal wage setting (Taylor 1980). This paper made two important breakthroughs. First, his model was an early example of what is now commonly referred to as a "New Keynesian Phillips curve," in which prices depend on both expectations of future prices as well as past prices. Second, he provided strong empirical evidence of nominal wage rigidities in the United States, supporting the case for a stabilization role for monetary policy even in models with deep micro foundations and rational expectations.

Moreover, the insight into the key role played by rigidities in wage setting continues to influence the development of macro models and our understanding of the effects of monetary policy on the economy. Although many simple macro models used in teaching and research assume sticky prices and abstract from sticky wages, in larger models used in central banks, such as the FRB/US model used at the Board Governors, wage rigidities play a central role. In addition, recent research using micro-founded DSGE models as well as the papers at this conference have confirmed that wage rigidities are important empirically and have also improved our understanding of the role of sticky wages as a source of the tradeoff policymakers face and of the welfare costs of business cycles.[3]

[3] See, for example, Erceg, Henderson, and Levin (2000) and Christiano, Eichenbaum, and Evans (2005).

The second branch of John's research that has had a lasting influence on our policy discussions is his work on developing empirical macroeconometric models with rational expectations. This work also led him to collaborate with Ray Fair in the early 1980s to develop a method to simulate nonlinear large-scale rational expectations models that is still used at central banks 25 years later (Fair and Taylor 1983). During the 1980s, he single-handedly developed an estimated model of the G7 economies that incorporated rational expectations, forward-looking behavior by households and firms, sticky prices and wages, and international linkages in a large-scale macroeconometric model (Taylor 1993a). This project demonstrated conclusively that it was possible to construct, estimate, and simulate such a model for real-world policy analysis. At the time, he was a one of just a few academics working on such large-scale models. If it were not for John's success at keeping the flame alive during that period, I fear that the ongoing development of new generations of macro models that incorporate better micro foundations and explicit treatment of expectations at the Board of Governors and other central banks would never have occurred.

Finally, let me turn to what I think of as the most important of John Taylor's contributions to policymaking: the development of a set of principles of good monetary policy. Perhaps not surprisingly, these principles are each exemplified by the Taylor Rule.

The first principle is that policy should be systematic and predictable. Remember that his famous paper was titled "Discretion versus Policy Rules in Practice" (Taylor, 1993b). This principle permeates the analysis and discussions at the Fed today. The Board staff regularly reports the policy prescriptions from estimated monetary policy

rules, and the model simulations that are used to illustrate risks assume policy will respond according to an estimated policy rule. Of course, extraordinary or novel circumstances can arise where policy needs to deviate from its standard approach, but that should be the exception, not—so to speak—the rule.

I should mention at this point how influential John's call for systematic policy has been at the Fed. When I became a Governor back in 1994, I was privy to little analysis that used monetary policy rules. At the time, I argued that the FOMC should, at a minimum, routinely monitor the recommendations of Taylor-type policy rules as a check on its judgmental decisions. In particular, I felt that the internal use of such Taylor-type rules might prove helpful in preventing the FOMC from overreacting to shocks—falling into the so-called "thermostat trap." Nowadays, I am pleased to say, such analysis is routinely provided and discussed.

The second principle is the so-called "Taylor Principle," namely, that the nominal interest rate must rise or fall by more than one-for-one with a corresponding movement in the inflation rate.[4] In a variety of models where spending depends on real interest rates, the Taylor principle is a necessary condition to avoid potentially catastrophic outcomes. In forward-looking models it is needed to assure a unique rational expectations equilibrium; in backward-looking models, it is needed to avoid explosive behavior. This principle seems obvious now, but Clarida, Gali, and Gertler (2000), among others, have argued that the Federal Reserve did not satisfy it during the 1970s, contributing to the poor economic performance during this period. Although there is an ongoing debate

[4] This principle is discussed in Taylor (1999). Woodford (2001) is one source for referring to this as the "Taylor Principle."

about how the Fed went wrong in the 1970s, we all agree that we need to satisfy the Taylor principle today.

The third principle, and one that is embedded in the Taylor rule, is that policy should "lean against the wind" in response to deviations from the desired levels of inflation and output. In response to a demand shock that lowers output and inflation, the funds rate is cut, restoring output and inflation back to their desired levels. In response to a supply shock that lowers output but raises inflation, the Taylor Rule implicitly embeds the tradeoffs of the objectives in the dual mandate by producing a path for policy that ultimately restores inflation to its long-run values but does so only gradually, avoiding sharp swings in output. Of course, the specification of the monetary policy rule that best achieves the central bank's goals is the subject of ongoing research, but the basic principle is widely accepted.

Finally, the fourth principle is that any monetary policy rule should be robust to uncertainty.[5] Indeed, the specification of the original Taylor Rule was not chosen to be optimal in any one particular model, but was based on its "good" performance in monetary-policy-rule evaluation exercises using a variety of macroeconomic models.[6] This approach places greatest weight on getting the "basics" right; that is, it emphasizes policy prescriptions in which we have the most confidence. This approach is purposefully modest in that it does not attempt to take advantage of all the potential benefits of the optimal policy in a given model. In fact, subsequent research has shown that the cost of

[5] See Taylor (1993, 1999b) and McCallum (1988) for further discussion of this principle.
[6] See the volume edited by Bryant, Hooper, and Mann (1993).

insuring against model misspecification is relatively small because fully optimal rules yield typically only small stabilization benefits over simple rules like the Taylor Rule.[7]

Unlike the other principles which are uncontroversial, this last principle is still the subject of research and debate. But, based on my experience, John's position on the benefits of robustness seems the right one to me. As a policymaker who relies on models and forecasts myself, I recognize the great degree of uncertainty about all aspects of our models and our limited ability to predict the future. Indeed, one of the strengths of the FOMC is that it brings together 19 different views of how the economy behaves and 19 different forecasts of the future. It would be a mistake to ignore these differences and rely too much on one particular model to guide our decisionmaking.

This conference has brought together leading economists from around the globe who continue the research programs that John Taylor began over the past 30 or so years. As I noted above, a key contribution has been to bring rational expectations into models used for monetary policy analysis. This research has had big payoffs in terms of improving our understanding of the economy and monetary policy.

But, looking ahead, to me the biggest challenge for macroeconomists and monetary policymakers in creating more realistic models will be how to incorporate some forms of deviations from perfect rationality and knowledge in macro models used for policy analysis. This may take the form of near-rational behavior as in behavioral economics or bounded rationality as in models of learning. I should note that one of John's earliest papers was concerned with the behavior of the economy while people learned (Taylor 1975). The asset price movements over the past decade amply illustrate that the economy does not always behave the way our standard models predict. More

[7] See, for example, Levin, Wieland, and Williams (1999).

generally, small deviations from full rationality in consumer or firm behavior can have large consequences on the behavior of the macro economy. This is a big challenge, but I am confident the payoffs will be large.

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