Improving the Use of Discretion in Monetary Policy *

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1   INTRODUCTION

The debate on whether a central bank should have a rule to set its policy instruments or alternatively to conduct monetary policy with discretion has heated up in recent years with proposed legislation in Congress, which has been passed by the House, to require the Federal Reserve to report on a "directive" rule similar to a Taylor (1993) rule for its policy instruments. In this paper, I discuss where I think the rules versus discretion debate is currently and argue that in a sense, this debate has been miscast, because a central bank does not have to choose only between adopting a policy rule versus pure discretion. Instead it can choose to adopt a discretionary regime that has rule-like attributes, a regime that Ben Bernanke and I referred to as "constrained discretion" in Bernanke and Mishkin (1997).   However, how can be discretion be constrained so it avoids the disadvantages of pure discretion? The answer I provide here is that monetary policy discretion can be improved by pursuing monetary policy communication that not only constrains discretion to be more rule-like, but also has additional benefits in enabling the markets to respond to shocks to the economy so there are better monetary policy outcomes.

2 THE RULES VERSUS DISCRETION DEBATE

First, let's define our terms. A *rule* requires that monetary policy is essentially automatic: it involves a precise prescription for how monetary policy should react to a set of economic circumstances. One example of a monetary policy rule is the constant-money-growth rule advocated by Milton Friedman, in which the money supply is set by the central bank to grow at a constant rate. A more recent alternative is the classic Taylor (1993) rule in which the policy interest rate, the federal funds rate, is set to be a weighted average of an output gap (actual output minus potential output) and an inflation gap (actual inflation minus the target inflation rate.) The polar opposite of a monetary policy rule, according to the traditional classification of policy regimes is based on *discretion*. Discretion, in its purist form, involves monetary policymakers setting their policy instruments on a day-to-day basis as economic events unfold, with no public commitments about its objectives or actions.

2.1 The Case for Rules

There are two basic arguments for monetary policy rules. First is that monetary policy makers cannot be trusted to make discretionary decisions about monetary policy because they are not to be trusted. In their classic study of monetary policy history, Friedman and Schwartz (1963) document many instances of Federal Reserve mistakes, as does Meltzer (2004, 2014) . Policy mistakes that followed the period discussed by Friedman and Schwartz and Meltzer, led to the Great Inflation that lasted from the late 1960s to 1979, until actions by the Federal Reserve under the chairmanship of Paul Volcker led to a low inflation period since the early 1980s. Monetarists such as Friedman, Schwartz and Meltzer have argued that if the Federal Reserve had pursued a constant-money-growth rule would these mistakes would have been avoided, so that monetary policy outcomes would have been greatly improved.

The second, and I would argue more powerful, argument for monetary policy rules results from the literature on the time-inconsistency problem described by Kydland and Prescott (1977), Calvo (1978) and Barro and Gordon (1983). The time-inconsistency problem occurs because economic agents or policy makers always have a temptation to deviate from an optimal

long-run plan, which is therefore time-inconsistent, when they operate with discretion. In other words, even when an optimal long-run plan is formulated, when tomorrow comes and the economic agent or policymaker reoptimizes, they renege on the optimal plan. In the case of monetary policy, monetary policy cannot achieve higher economic growth and lower unemployment in the long run by pursuing expansionary policy to produce higher inflation. Thus the optimal plan is for monetary policy to pursue price stability, that is, a low and stable inflation rate. However, monetary policy makers are tempted to pursue a discretionary monetary policy that tries to exploit the short-run tradeoff between unemployment and inflation and so pursue more expansionary monetary policy than firms and people expect because such a policy would boost economic output and raise employment, thereby lowering unemployment in the short run. However, because there is no long-run tradeoff between unemployment and inflation, this discretionary policy only leads to the undesirable outcome of higher inflation in the long run, while it is unsuccessful in producing lower unemployment.

Elsewhere I have criticized this argument for the time-inconsistency problem in monetary policy because I do not believe that central bankers want to renege on an optimal plan to keep inflation low and stable. After all, by recognizing that there is no long-run tradeoff between unemployment and inflation, monetary policy makers can avoid the temptation to pursue overly expansionary monetary policy. Indeed, I have argued (Mishkin, 2016) that central bankers tend to too be too conservative along the lines described by Rogoff (1985) and so have a tendency to not worry sufficiently about inflation being too low. Nonetheless, I believe that the time-inconsistency problem is a serious problem for monetary policy, not because it stems from central bankers, but because politicians are short-sighted and put pressure on central bankers to pursue overly expansionary monetary policy to lower unemployment in the short run. This pressure can lead to central bankers reneging on the optimal, low inflation plan, even if they would not renege otherwise. In other words, the time-inconsistency problem arises because central banks cannot be completely insulated from political pressure (Mishkin and Westelius, 2008).

A commitment to an instrument, monetary policy rule that embeds a nominal anchor is one way of avoiding the time-inconsistency problem. Once a monetary policy rule such as a

constant-money-growth rule or a Taylor rule is adopted, monetary policy no longer can try to exploit the short-run tradeoff between unemployment and inflation because as the nominal anchor of either the money supply or the target level of inflation is exceeded, monetary policy automatically tightens, so that inflation is stabilized. Furthermore, the presence of a nominal anchor in an instrument rule results in an anchoring of expected inflation, which results in a better tradeoff between output gaps and inflation gaps.

There can also be a time-inconsistency problem in the other direction, when the inflation rate is too low, particularly when the policy interest rate has hit the zero lower bound and this nominal interest rate cannot go below zero. In this case, better policy outcomes would occur from what Woodford (2003) refers to as history-dependent policy: that is, if the central bank could commit to keep the policy rate "lower for longer," so that when a desirable inflation rate is reached, the policy rate would be lower than it should be to keep the inflation rate at the desired level. However, once the desired inflation rate occurs, the central bank would have a temptation to renege on this commitment and raise the policy rate to a level that is consistent with keeping the inflation rate at the desired level. An instrument rule that sets the policy rate at a lower rate when the price level is below a target path for the price level would overcome this time-inconsistency problem.

2.2 The Case for Discretion

There are four main arguments against adoption of a monetary policy, instrument rule, and so argue in favor of the conduct of monetary policy with some discretion.

1. A rule requires a reliable model of the macroeconomy.

2. A rule requires that the structure of the economy is stable.

3. A rule cannot foresee every contingency.

4. A rule does not allow judgement.

5. Monetary policymakers are not less trustworthy than rules.

We look at each of these in turn.

2.2.1 A Rule Requires a Reliable Model of the Macroeconomy

For an instrument rule to produce good economic outcomes, policymakers must have a reliable model of the macroeconomy so that they can have confidence that the instrument rule they choose is close to the optimal policy rule. For example, deriving a reliable Taylor rule requires that the central bank has confidence in its estimate of 1) the natural (equilibrium) rate of interest, 2) the natural rate of unemployment and 3) that there is a stable Phillips-curve relationship.

As we have seen recently, there have been major reassessments of the value of the natural (equilibrium) rate of interest. The Summary of Economic Projections, which provides projections from all the FOMC participants of long-term inflation and the long-term policy rate under appropriate policy , shows that the FOMC participants have substantially reduced their estimates of the natural rate of interest in recent years. Academic studies (Barsky, et. al., 2014, Curdia, et. al., 2014 and Hamilton, et. al., Harris, Hatzius and West, 2015) also suggest that the natural rate of interest has fallen in recent years, and they also emphasize how uncertain estimates of the natural rate of interest are.

Research also indicates that estimates of the natural rate of unemployment are highly uncertain (Staiger, Stock and Watson (1997) and Federal Reserve officials have cast doubts on whether the Phillips curve is sufficiently stable to provide a reliable guide to monetary policy (e.g., recent remarks by Brainard (2015) and Tarullo (2015). Indeed, Orphanides (2002) has argued that the very high inflation outcomes in the United States in the 1970s were due to an underestimate of the natural rate of unemployment on the part of Federal Reserve policymakers.

2.2.2 A Rule Requires that the Structure of the Economy is Stable

A successful instrument rule requires that the structure of the economy does not undergo substantial changes so the instrument rule remains valid. The failure of monetary targeting in many countries in the 1980s indicates the dangers of adopting instrument rules. A particularly striking example occurred in Switzerland in the late 1980s, as documented in Bernanke, Laubach, Mishkin and Posen (1999). In 1980, the Swiss National Bank adopted a growth rate target for the monetary base. In 1988, the Swiss introduced a new interbank payment system, the Swiss Interbank Clearing (SIC), and a wide ranging revision of commercial banks liquidity requirements. These structural changes caused a severe drop in banks' desired holdings of deposits at the Swiss National Bank, and so a smaller amount of the monetary base was now needed relative to aggregate spending. The resulting upward shift in velocity meant that adherence to the monetary base target led to very high inflation, with Swiss inflation rising to above 5%, well above that of the rest of Europe, which of course horrified the anti-inflation Swiss. The problem with monetary targeting instrument rules is exemplified by the colorful

quote from Gerald Bouey, the governor of the Bank of Canada in the 1980s, who said, "We didn't abandon monetary aggregates, they abandoned us."

2.2.3. A rule cannot foresee every contingency.

An instrument rule can be too rigid because it cannot foresee every contingency. For example almost no one could have predicted that problems in one small part of the financial system, subprime mortgage lending, would lead to the worst financial crisis since the Great Depression. The unprecedented steps that the Federal Reserve took during the crisis to prevent it from escalating into an even deeper crisis (Mishkin and White, 2016) could not have been written into a policy rule ahead of time.

2.2.4. A rule does not allow judgement.

An instrument rule does not easily incorporate the use of judgement. Monetary policy is as much an art as a science. Monetary policymakers need to look at a wide range of information in order to decide on the best course for monetary policy, and some of this information is not easily quantifiable. As an illustration, in the first go-round of every FOMC meeting, the Federal Reserve Bank presidents provide anecdotal information about what their contacts their Federal Reserve district tell them about the state of the economy, and this information is used by FOMC participants in their decisions about setting the monetary policy instrument. Another illustration is Alan Greenspan's use of judgement in the mid to late 1990s to argue that monetary policy

should not be tightened despite the rapidly growing economy and falling unemployment rate. Greenspan was able to convince the FOMC to refrain from raising rates despite recommendations from the Board's models that the FOMC do so. Greenspan was proved to be right, earning him the moniker of "maestro" (Woodward, 2000).

Judgement, which in its nature is discretionary, is thus an essential element of good monetary policy, as has been emphasized by Svensson (2003, 2005). But how do you put judgement into an instrument rule, when judgement necessarily is based on non-quantifiable information? There is no way that I can see how this might be done and so the need for judgement in monetary policy provide another strong argument against adoption of an instrument rule.

2.2.5 Monetary Policymakers are Not Less Trustworthy than Rules

One argument for adoption of rules is that they are more trustworthy than policymakers. There are certainly cases where this has been true in the past, as Friedman and Schwartz (1963) and Meltzer (2004, 2014) have documented serious policy mistakes made by the Federal Reserve. However, I would argue that beginning in the 1980s, monetary policy in the United States has been quite good, although not everyone would agree (e.g., Taylor, 2007). Inflation has been low and until the global financial crisis in 2007 business cycle fluctuations have been quite muted. Although I agree with John Taylor (2007) that monetary policy was too easy in the run up to the Great Recession because inflation did overshoot the 2% level, I do not agree with Taylor (2007) that monetary policy was a key reason why the housing bubble occurred for the reasons outlined by Bernanke (2010). Thus, I view the monetary policy mistakes made during

this period as minor. However, I believe that the Federal Reserve's actions during the crisis and in its aftermath were far better than what would have been dictated by monetary policy, instrument rules, as the next subsection discusses.[1] Indeed, given the difficult circumstances, I think future historians will give the Fed very high grades on its performance during this period. Indeed, as argued below, the Federal Reserve proved far more trustworthy in this period than would have a Taylor rule. Clearly the Federal Reserve learned a lot from its past mistakes during the Great Depression and the Great Inflation of the 1970s, which led to far better monetary policy since the late 1970s, and arguing that is less trustworthy than a policy instrument rule is now harder to make.

2.2.6 An Illustration Using a Traditional Taylor Rule

To illustrate the arguments above, let's see what a traditional Taylor (1993) rule would have recommended for monetary policy during the global financial crisis and its aftermath. This is only an illustration because more sophisticated instrument rules might do a better job at stabilizing aggregate output and inflation than the simple, traditional Taylor rule discussed here. However, I think that even more sophisticated Taylor or other instrument rules that would have reasonably been developed *before* the crisis would likely have run into similar problems.

Figure 1 provides a comparison of the actual federal funds rate with a Taylor (1993) rule using CBO estimates of potential output provided in the FRED database.

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[1] Note that I have a conflict of interest in making this statement because I was an active participant in Federal Reserve decisions during the early stages of the financial crisis.

Figure 1
Federal Funds Rate and the Taylor Rule, 2002-2017
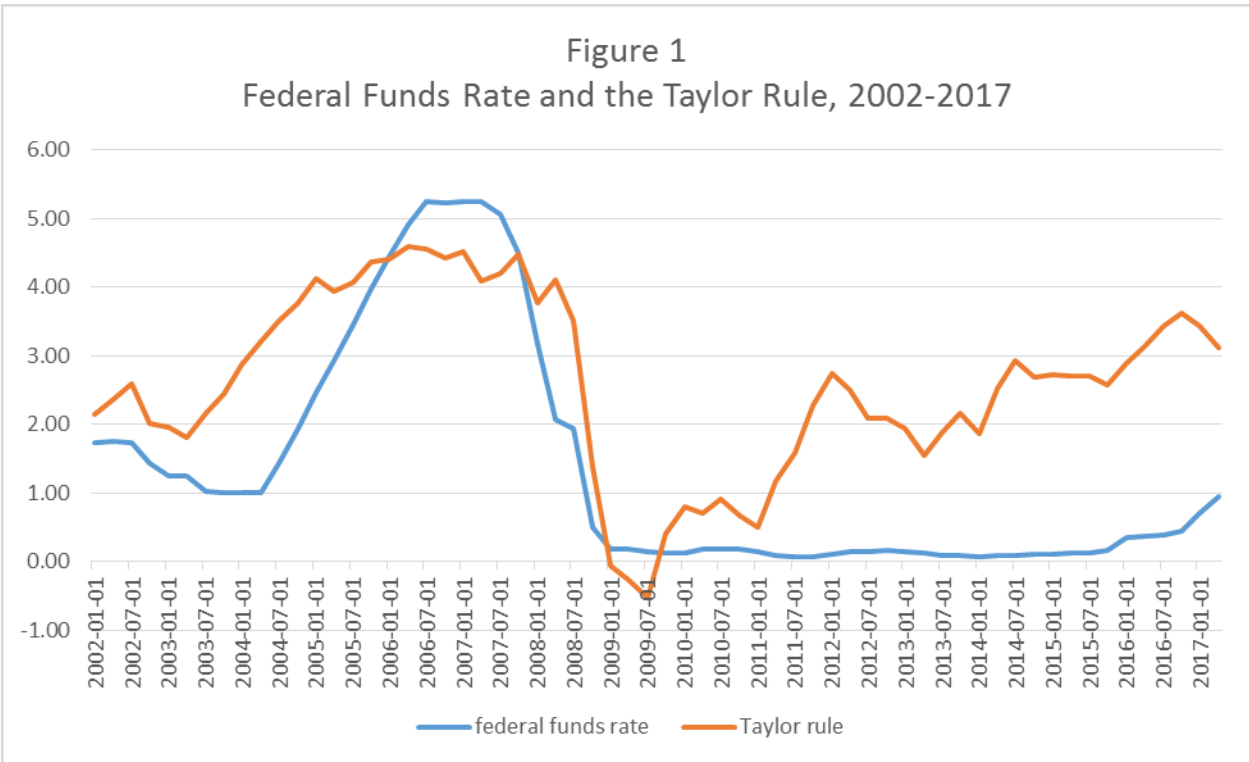
The global financial crisis started on August 2007 with the seizing up of interbank markets as a result of an announcement by the French bank BNP Paribas that is was suspending redemption of shares held in some of its money market funds. At the time, the U.S. economy was growing rapidly and inflation was rising. The Taylor rule which raises the federal funds rate when either the output gap or the inflation gap rises, would recommend a rise in the federal funds rate. Indeed, the 1993 Taylor rule shown in the figure would have recommended a rise in the federal funds rate of 38 basis points from the second quarter of 2007 to the fourth quarter of 2007. Instead, the FOMC decided to lower the federal funds rate by 25 basis points (0.25 percentage points) at the September FOMC meeting, and then by another 50 basis points in the fourth quarter, exactly the opposite of what the Taylor rule would have suggested.

As you can see in Figure 1, from the fourth quarter of 2007 to the second quarter of 2008, the Taylor rule kept the federal funds rate at fairly high level, around 4%, while the Federal Reserve lowered the federal funds 300 basis from the 5% level to the 2% level. The Taylor rule only recommended a substantial decline in the federal funds after the second quarter of 2008, but even then the FOMC's setting of the federal funds rate was well below the recommendation of the Taylor rule through the fourth quarter of 2008.

I think that very few economists would argue that the economy would have been better off if the Fed had followed the Taylor rule during this episode and kept the federal funds rate so high during the financial crisis. Indeed, given the course of the economy once the financial crisis began, the Federal Reserve can be criticized for not lowering the federal funds rate fast enough. Indeed, as is revealed by the FOMC transcripts, at the December 2007 FOMC meeting, in that meeting I argued strenuously for more pre-emptive easing of monetary policy and indicated that I would have preferred to dissent from the FOMC decision only to lower the federal funds rate by 25 basis points, but was not doing so because it might have suggested to the markets that I was less supportive of the Chair, Ben Bernanke, then I was. Then in a speech that I gave on January 11, 2008 (Mishkin, 2008a), I provided the arguments why a more preemptive monetary policy was needed to cope with the financial crisis. Subsequently, the Federal Reserve pursued a far more expansionary monetary policy, although it was insufficient to keep the economy going into the most severe recession of the post World War II period, with inflation falling well below the 2% inflation objective, which is even embedded in the Taylor rule. If the Federal Reserve had not used discretion and departed from the Taylor rule, the economic outcomes could have been truly horrendous. Not only would inflation have fallen even lower, so that there would

have been a real possibility of a deflation setting in, as occurred in Japan after 1998, but also the decline in GDP would have been even more severe. Indeed, the possibility of the Great Recession turning into a full-scaled depression cannot be ruled out.

Why was a discretionary departure from the Taylor rule necessary? First, the global financial crisis revealed that the standard general equilibrium models macroeconomic models used by both central banks and academic economists were unreliable because they had ignored financial disruptions as an important factor in the evolution of the economy (see Mishkin, 2011). Second, is that the global financial crisis led to a change in the structure of the economy that made the economy more nonlinear. (However, if financial factors had been built into general equilibrium macroeconomic models before the financial crisis, the change in structure could just be thought of as the pre-crisis macro models being misspecified.) Third, is that the financial crisis was not anticipated by macroeconomists, even those like myself who had studied financial crises in emerging market economies, but couldn't imagine that such a crisis would occur in a developed economy like the United States. The contingency of this financial crisis was therefore not even comtemplated in the literature on monetary policy rules. Fourth, is that the relatively rapid reactions of the Federal Reserve to the financial crisis and the departure from the Taylor rule were not based on hard data. Instead it was the judgement, very often based on anecdotal evidence and conversations with financial market participants, that led the Fed to depart from the Taylor rule. This was certainly true in my case, where my advocacy of more expansionary monetary policy to contain the crisis was not based primarily on hard data, but rather on my judgement that the financial disruption was going to have very adverse effects on the economy as a result of my reading and research on what had happened in previous financial crises.

All of the objections to adoption of an instrument rule that were articulated at the beginning of this section therefore came to play in the need for discretion and a departure from the Taylor rule during the global financial crisis.

What happened after the crisis was over in 2009 also argues for discretion and departures from the Taylor rule. As you can see in Figure 1, starting in the fourth quarter of 2009, the Taylor rule would have suggested that the federal funds rate should rise steadily to over a 3% rate currently. In contrast, the Federal Reserve has been raising rates very gradually, so by the second quarter of 2017 they are more than 200 basis points below the Taylor rule recommendation. Again, I think there are very few economists who would advocate that they Fed should have followed the Taylor rule and raised the federal funds rate by 300 basis points, instead of the around 100 basis points that they actually did.

What is the rationale for this departure from the Taylor rule? First is that the equilibrium, natural rate of interest has been falling over time, although we don't know exactly by how much, while the Taylor rule has the equilibrium rate fixed at 2%. We could either see this as a misspecification of the model or alternatively that the structure of the economy has changed, leading to a decline in the equilibrium interest rate. In addition, inflation has remained below the 2% desired level, despite very low unemployment rates. This suggests that either the model of the Phillips curve is wrong or that the estimate of the natural rate of unemployment is too high. Getting monetary policy right in this environment where we are not sure what is going on requires good judgement.

We thus see that the objections to an instrument rule come into play again in arguing for the use of discretion, rather than following a Taylor rule, in setting monetary policy in the period from late 2009 to the present.

2.3 Constrained Discretion: Making Discretion More Rule-Like

The arguments above argue against adoption of an instrument rule for monetary policy and suggest that there is a need for discretion. However, we have also seen that pure discretion also has undesirable properties. But is there something in between?

Bernanke and Mishkin (1997) argue that the rules-versus-discretion debate has been miscast because the dichotomy between rules and discretion is too simple. Advocates of rules argue against *pure* discretion which is subject to the time-inconsistency problem, while advocates of discretion argue against *rigid* rules. Bernanke and I argued that by imposing a structure that imposes discipline on monetary policy, but does not eliminate flexibility, what we called *constrained discretion,* monetary policy could avoid some of the disadvantages of either rigid rules or pure discretion. Another way of thinking about constrained discretion is that it is an attempt to achieve the best of both worlds of rules and discretion by making discretion have rule-like properties, so that it avoids the time-inconsistency problem.

3 HOW CAN MONETARY POLICY DISCRETION BE MADE MORE RULE-LIKE?

The conclusion constrained discretion might be a better approach to the conduct of monetary policy than either an instrument rule or pure discretion, still raises the question of how should a framework of constrained discretion be designed so that it is rule-like, and so avoids the time-inconsistency problem. A first step in making monetary policy discretion more rule-like is for the monetary authorities to constrain discretion to avoid the time inconsistency problem by adopting a nominal anchor and being accountable to not deviate very far from it. However, higher accountability of monetary policy to achieve the nominal anchor, with a resulting improved monetary policy performance, can be enhanced by communication of the monetary policy reaction process.

Let's look at each in turn.

3.1 Adoption of a Nominal Anchor

An increasingly popular approach to adopting a nominal anchor and being accountable to not deviate from it is inflation targeting. As emphasized in Bernanke and Mishkin (1997), Bernanke, et. al. (1999) and Mishkin (1999), inflation targeting is a form of constrained discretion that can avoid the time-inconsistency problem by not only announcing an inflation target, but also by being accountable to achieve the target through communication about how the target is to be achieved and how past policy actions were consistent with achieving the inflation target. Other similar approaches adopt other target criteria with a nominal anchor such as price-level targeting or nominal GDP targeting, or alternatively, as in Woodford (2003), a target criterion that involves a tradeoff between output gaps and inflation gaps. These approaches are sometimes referred to as *target rules*. This is because they have rule-like properties that allow them to mitigate the time-inconsistency problem. However, these approaches are not rules in the sense that they provide an automatic prescription for how monetary policy is conducted. Instead

they allow a lot of discretion on the part of monetary policymakers, including a lot of judgement as to how monetary policy instruments should be set to achieve the target criterion.

It should also be pointed out that even if monetary policy makers do not explicitly adopt a nominal anchor by announcing a target for a nominal variable, they may do nearly as well by implicitly adopting a nominal anchor. For example, until January 2012, when the Federal Reserve adopted a 2% inflation target, the Federal Reserve did not have an explicit nominal anchor. Nonetheless, the Federal Reserve did emphasize that price stability was its most important long-term objective and expected inflation did become reasonably well-anchored both before and immediately after the global financial crisis. Indeed, one of the great successes of the Bernanke-Fed before 2012 was that it was able to anchor inflation expectations during the financial crisis through highly active, discretionary actions that prevented inflation expectations from plummeting, as they did in Japan. When I was a member of the Board of Governors of the Federal Reserve System, I nonetheless argued that adopting an explicit inflation target would be an improvement over the Fed's monetary policy strategy at the time because it would make it more likely that inflation expectations would be anchored in the future (Mishkin, 2008b).

Advocates of instrument rules criticize inflation targeting for being too discretionary. I do not want to go into great detail as to how inflation targeting or its variants can constrain discretion to ensure that monetary policymakers are less tempted to renege on optimal plans. This is well-covered territory. The evidence, however, does support that countries that have adopted inflation targeting have been able to anchor inflation expectations well (Gürkaynak, et. al, 2010), which only occurs if this strategy is rule-like and overcomes the time-inconsistency problem. Furthermore, countries that have adopted inflation targeting have had better inflation performance, that is, low and stable inflation, without bearing the cost of larger fluctuations of output (Mishkin and Schmidt-Hebbel, 2002).

Indeed, the excellent performance of inflation targeting, which can be viewed as a new technology for monetary policy, provides a counter to advocates of instrument rules who claim that central banks cannot be trusted to conduct discretionary monetary policy and so should be bound by an instrument rule. It is certainly true that central banks, such as the Federal Reserve, have made serious mistakes in the past, but it is much harder to claim that central banks,

particularly in developed countries with solid institutional frameworks, cannot be trusted to conduct monetary policy when they are using the new technologies such as inflation targeting. Inflation targeting central banks have been able to avoid the time-inconsistency problem and keep inflation low and stable. I would argue that advocates of instrument rules are fighting the last war. They argue for an instrument rule to prevent a problem that is no longer occurring, high inflation.

3.2 Communicating a Monetary Policy Reaction Process

Although adopting a nominal anchor such as an inflation target can go a long way to constraining discretion and making it rule-like, it might not create enough accountability to constrain discretion sufficiently; the long lags from monetary policy to inflation mean that it may be several years before the monetary policy authorities can be monitored to see whether they took appropriate steps to achieve the target. Indeed, I suspect that this is why advocates of instrument rules do not feel that inflation targeting is sufficiently rule-like and that adoption of a rule is a better approach to the conduct of monetary policy.

This concern that just announcing a nominal anchor is not good enough, can be addressed by improving the use of discretion with better communication about the monetary policy reaction process, that is, how monetary policy instruments would change as economic circumstances change. (Note that I use the term monetary reaction *process* rather than monetary policy reaction *function*. A function is a mathematical construct that generates an output from quantifiable inputs. Since, as I argue later, judgement requires that not all inputs into optimal monetary policy decisions have to be quantifiable. Thus a description of monetary policy reactions to evolving economic circumstances is better described as a reaction process rather than a reaction function.) If the markets and the public have a better understanding of the policy reaction process, they can evaluate whether the setting of the policy instruments is consistent with achieving the nominal anchor target, thus increasing the accountability of the monetary policy authorities for achieving this target.

It is true that the markets can glean some information about the policy reaction process by seeing how actual monetary policy actions react to the incoming data, as the evidence presented below indicates. However, the monetary authorities can provide even more information about their policy reaction process and increase accountability by communicating how the policy instruments would change as economic circumstances change and then explaining how the current setting of their policy instruments is consistent with this policy reaction process. Then as the economy evolves, the public and the markets can assess whether monetary policy is trying to achieve the nominal anchor, even before the outcomes on this anchor are revealed. However, communication about the policy reaction process can be improved even further, with additional advantages in terms of producing better economic outcomes, by the use of what Feroli et. al. (2017) refer to as *data-based forward guidance*: that is, providing information on the future path of the policy rate conditional on the data that could occur over the policy horizon.

3.2.1 Data-Based Forward Guidance

Data-based forward guidance requires not only that the central bank provides information on the policy path given the central bank's forecasts, but also communicate how that path would change if the central bank's forecast changes. One central bank that does this is the central bank of Norway, the Norges Bank. The Norges Bank does this first providing a baseline projected policy path along with a fan chart showing the confidence intervals around the policy path. More importantly, the Norges Bank explains why the policy path may deviate from the baseline path by providing several scenarios as to how the policy path would change when economic outcomes change. It is true that because the governance structure of the FOMC includes up to nineteen particpants (seven governors and twelve Federal Reserve Bank presidents) that make policy decisions, it would be extremely difficult to derive one probability distribution for the policy path outcomes or an agreement on how the policy path would change when economic outcomes change. This difficulty occurs because the Federal Reserve does not speak with one voice, as occurs with the Norges Bank. However, FOMC participants could do a far better job of

communicating how their projections of the policy path would react to economic events. Alternatively, the FOMC might delegate to the Chair to provide information on how the committee's view of the future policy path might change under different scenarios for how the economy evolves.

This form of data-based forward guidance would not only make it easier for the public and the markets to evaluate whether the actual setting of policy instruments is consistent with the objective of hitting the nominal anchor target, but also has desirable expectations dynamics that can improve monetary policy outcomes.

To see why data-based forward guidance leads to better expectations dynamics, consider a negative shock to aggregate demand when both the inflation gap and output gap are at zero. The result would be that both the inflation and output gaps would turn negative in the future and an optimal monetary policy reaction process would indicate that the federal funds rate path would be lowered. If the central bank's reaction process is well understood by the markets and the public, then without -the Fed taking any actions, expectations of the future federal funds rate would decline, which would result in lower longer-term interest rates and stimulate the economy. The result would then be an immediate offset to the negative aggregate demand shock which would help stabilize the economy.   Another way of stating this result is that successful central bank communication about the monetary policy reaction process would enable the markets to do a lot of the work (heavy lifting) for the central bank. If the monetary policy reaction to shocks is predictable, expectation dynamics work to tighten or loosen financial conditions appropriately when there are shocks to the economy.

However, forward guidance is often not done in a data-based way. As described in Feroli et. al. (2017) the Federal Reserve has often engaged in a second type of forward guidance, *time-based forward guidance,* in which a central bank commits to set the policy rate at specific levels at specific calendar dates. An extreme version of time-based forward guidance would be a central bank committing not to raise interest rates from their current level for several years. Such a commitment would ignore incoming information, which is why the forward guidance is *time-based*.

Not only does this time-based forward guidance provide less information about the policy reaction process so that there is less accountability of the central bank to meet its nominal anchor objectives, but it results in perverse expectations dynamics. Again consider the situation in which the positive employment report leads to expectations that inflation will be higher than previously expected. With time-dependent forward guidance, the projected policy path does not change, but expected inflation rises. This means that the expected path of future *real* interest rates, policy interest rates minus expected inflation, now declines. The effect of the positive employment report shock is then an effective easing of monetary policy, the opposite to what would be an optimal effective monetary policy response.

This undesirable feature of time-dependent forward guidance is exactly the same problem created by the zero lower bound for the policy rate, as discussed in Eggertson and Woodford (2003). They point out that when there is a negative aggregate demand shock and the policy rate is at the zero lower bound, then a negative aggregate demand shock leads to a decline in expected inflation and therefore a rise in real interest rates, which further weakens aggregate demand. Negative aggregate demand shocks when the zero lower bound is binding therefore can lead to prolonged economic downturns. Time-dependent forward guidance creates a similar problem because, just as occurs when the policy rate is at the zero lower bound, a negative aggregate demand shock leaves the projected future path of the policy rate unchanged, so that real interest rates rise, thereby propagating the negative aggregate demand shock further.

Does empirical evidence support the theory that time-based forward guidance leads to bad expectation dynamics because it leads to interest rates becoming insensitive to macroeconomic news? Feroli et. al. (2017) find that the answer is yes. Using the methodology developed by Swanson and Williams (2014), they evaluate how responsive interest rates were to economics news during periods when the Federal Reserve used time-based forward guidance, data-based forward guidance or no forward guidance at all. Chart 3.3 from Feroli et. al. (2017) reproduced as Figure 2 below shows the sensitivity of Treasury bond rates to macroeconomic news when there is no forward guidance, data-based forward guidance, or time-based forward guidance. As the figure shows, time-based forward guidance is associated with lower sensitivity of interest rates to macroeconomic news at all of the maturities they examine. Time-based

forward guidance not only leads to less sensitivity to macroeconomic news than does data-based forward guidance, but also less than when there is no forward guidance at all. Indeed, the results in Feroli et. al. (2017) indicate that even without forward guidance markets are able to glean some information about the monetary policy reaction process, and this is an improvement over time-based forward guidance.

Figure 2: Sensitivity of Interest Rates to Economic News and Forward Guidance, 2001-2015
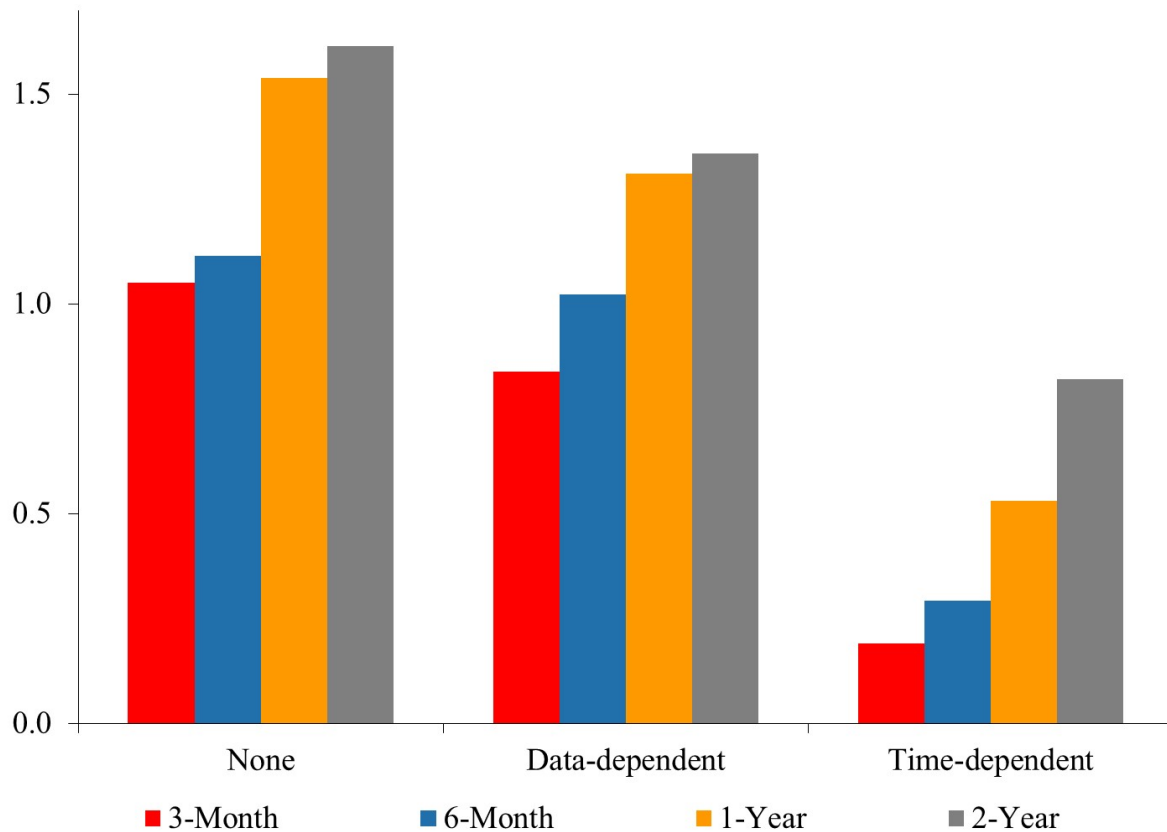
*Source: Feroli et. al. (2016).

Note that the results in Figure 2 is not driven by the zero-lower bound constraint during the post Great-Recession period. Even excluding the zero lower bound period, the sensitivity of interest rates to macroeconomic news is lower during periods in which FOMC communication on forward guidance is more strongly time-dependent.

3.2.2 Why Communicating a Monetary Policy Reaction Process is Not an Instrument Rule

There is an important subtle issue about the benefits of a central bank communicating a monetary policy reaction process. At first glance, a monetary policy reaction process appears to be very similar to instrument rule like the Taylor rule. After all, a Taylor rule is a very simple way of specifying a monetary policy reaction function. So why is data-based forward guidance very different from adoption of an instrument rule, such as a Taylor rule. The answer is that optimal monetary policy requires that the policy reaction process changes over time, either as monetary policymakers learn more about how the economy works or when the structure of the economy changes. Furthermore, the policy reaction process might need to be modified when there are unforeseen contingencies that were previously not part of the reaction process, but now need to be introduced into the reaction process. Judgement should also certainly be a feature of optimal policy as demonstrated by Svensson (2005) and should also be part of a monetary policy reaction process. A Taylor rule, which does not change over time, can therefore be far from an optimal policy.

Unlike a Taylor rule, data-dependent forward guidance can be consistent with optimal monetary policy, but this requires that it changes if the optimal monetary policy reaction process changes. This requires that projections of the future policy path not only must be altered when forecasts of the economy change, but also when the central bank has reasons to expect that the model of the economy is changing. Data-dependent forward guidance thus requires substantial communication to explain not only the past policy reaction process, but also any reasons for changes in the reaction process.

To understand this point better, consider what optimal, data-dependent forward guidance might have looked like when the global financial crisis started in August of 2007. At the time, inflation was rising and the economy was still growing rapidly in the third quarter. The Federal Reserve dramatically deviated from its previous reaction process by aggressively cutting the federal funds rate even before the economy and inflation had turned down. If the Fed had been providing data-based forward guidance, it would have needed to explain that the disruption to

financial markets required a change in the policy reaction process, with much easier monetary policy in the future in response to financial shocks than had been anticipated earlier.   Indeed, such a shift in the policy reaction process is exactly what would have been needed to stabilize both aggregate output and inflation. If this communication led to the markets understanding that there had been a shift in the policy reaction process, longer-term interest rates would have fallen more rapidly in response to news that the financial disruption was getting worse. This would have helped monetary policy to be even more expansionary than it otherwise would have been, by helping offset some of the negative shocks to the economy from the ongoing financial crisis.

4   CONCLUDING REMARKS

In this paper, I have argued that the rules versus discretion debate is miscast because monetary policy does not have to choose only between adopting a policy instrument rule or pure discretion, both of which have serious shortcomings. Instrument rules can lead to poor economic outcomes if the model of the economy is not reliable or the structure of the economy is unstable, or because rules cannot foresee every contingency or allow judgement. Pure discretion can lead to policy mistakes and is subject to the time-inconsistency problem where there monetary policy reneges on the optimal long-run plan. Instead of making the stark choice between an instrument rule and pure discretion, another choice is to improve discretion by constraining it so it has rule-like properties. But how can discretion be constrained and be accountable to be rule-like? I argue that monetary policy discretion can be improved by 1) adopting a nominal anchor such as an inflation target, a monetary policy strategy that has proved to be very successful in recent year, and 2) communication of a monetary policy reaction process, especially through data-based forward guidance, in which the monetary policy authorities describe how the future policy path will change as economic circumstances change.

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