Conference draft. Preliminary and incomplete. Comments welcome.

What Rule for the Federal Reserve?
Forecast Targeting

Lars E.O. Svensson[*]
Stockholm School of Economics, CEPR, and NBER

First draft: April 2017
This version: October 2017

Abstract

The arguably most appropriate rule for the Federal Reserve to follow is *forecast targeting*. It means selecting a policy rate and policy-rate path so that the forecasts of inflation and employment "look good," in the sense of best fulfilling the dual mandate of price stability and maximum employment, that is, best stabilize inflation around the inflation target and employment around its maximum sustainable rate. It also means publishing the policy-rate path and the forecasts of inflation and employment forecasts and, importantly, explaining and justifying them. This justification may involve demonstrations that other policy-rate paths would lead to worse mandate fulfillment. Publication and justification will contribute to making the policy-rate path and the forecasts credible with the financial market and other economic agents and thereby more effectively implement the Federal Reserve's policy. With such information made public, external observers can review Federal Reserve policy, both in real time and after the outcomes for inflation and employment have been observed, and the Federal Reserve can be held accountable for fulfilling its mandate. In contrast to simple policy rules that rely on very partial information in a rigid way, such as Taylor-type rules, forecast targeting allows all relevant information to be taken into account and has the flexibility and robustness to adapt to new circumstances.

JEL codes: E52, E58
Keywords: Flexible inflation targeting, monetary policy rules, discretion and commitment

The presumption that the Taylor rule is the right rule, or the right kind of rule, I think, is no longer state-of-the-art thinking. [Svensson (2003)] argues that Taylor rules are not robust responses to complex situations.

The Fed has a rule. The Fed's rule is that we will go for a 2% inflation rate; we will go for the natural rate of unemployment; we put equal weight on those two things; we will give you information about our projections, our interest rate. That is a rule, and that is a framework that should clarify exactly what the Fed is doing. (Bernanke, 2015b)

1   Introduction

How should the Federal Reserve conduct monetary policy so as to best fulfill its mandate of price stability and maximum employment? What decision-making process should the Federal Reserve follow, what information should it rely on, and how should it set is policy instruments? What of its information, deliberations, and decision should the Federal Reserve publish? How can the Federal Reserve's policy conduct best be reviewed and how can the Federal Reserve most effectively be held accountable for fulfilling its mandate?

These issues are arguably always of importance, but they have recently become more urgent in the context of recently proposed legislation by the U.S. Congress. According to the Fed Oversight Reform and Modernization (FORM) Act (U.S. Congress, 2015) (and with identical wording more recently in in Financial CHOICE Act), the FOMC Chair shall within 48 hours after each FOMC meeting submit a "Directive Policy Rule" (DPR) which identifies the "Policy Instrument" and "includes the coefficients" through which the "Intermediate Policy Inputs" determine the level of the policy instrument. In particular, the DPR shall

> include a statement as to whether the Directive Policy Rule substantially conforms to the Reference Policy Rule and, if applicable, (A) an explanation of the extent to which it departs from the Reference Policy Rule; (B) a detailed justification for that departure; ... (U.S. Congress, 2015, section 2)

Importantly, the Reference Policy Rule is specified in words and numbers to be the standard Taylor (1993) rule for the federal funds rate,

$$i_t = 2 + \pi_t + 0.5\,(\pi_t - 2) + 0.5\,y_t, \tag{1}$$

where i_t denotes the federal funds rate in quarter t, π_t denotes inflation over the previous four quarters and y_t denotes the gap between GDP and an estimate of potential GDP.

Clearly, these provisions in the legislation makes the Taylor rule the benchmark for the Federal Reserve's monetary policy, and if there are any departures from the rule, these departures require

"a detailed justification." Furthermore, the Government Accountability Office (GAO) would be responsible for determining whether the FOMC's DPR would meet all the legislations's criteria. Any time the FOMC's DPR was judged not to be in compliance with the GAO-approved rule, or anytime the FOMC just changed its DPR, the GAO would have to conduct a full review of monetary policy and submit a report to the Congress.

As explained in a letter from Chair Yellen to the Congress (Yellen, 2015), for several reasons the provisions of the FORM Act would severely impair the Federal Reserve's ability to carry out its congressional mandate to promote effectively the goals of maximum employment and stable prices. One obvious reason is that the provisions would threaten the Federal Reserve's considerable independence in deciding how to best fulfill its mandate. The provisions would effectively put the Congress and the Government Accountability Office in the role of reviewing short-run policy decisions and in a position to influence those decisions in real time. There is considerable theoretical and ample historical evidence that such short-run political interference in monetary policy leads to poor economic outcomes.

Another reason is that there are considerable problems with Taylor-type rules that make them lead to poor economic outcomes in many situations. A Taylor-type rule is too restrictive and mechanical, does not take into account all relevant information, and lacks the flexibility required to handle complex and changing situations.[1]

More precisely, as discussed in Svensson (2003), first, a Taylor-type rule is not optimal, and in some circumstances it is far from optimal. A Taylor-type rule makes the policy rate respond with some fixed coefficients to the current inflation gap and either the current GDP gap or the current unemployment gap.[2] But good monetary policy needs to respond to much more information than is contained in the current observations of those gaps. In particular, in order to best fulfill the mandate of maximum employment and price stability, it is not sufficient for the policy rate to respond only to the current levels of inflation, GDP, and employment or unemployment.

---

[1] Federal Reserve Board (2017) discusses the Federal Reserve's views on and current use of different policy rules.

[2] Svensson (2003) provides a more systematic discussion of monetary policy rules. A monetary policy rule can more generally be defined as "a prescribed guide for monetary policy conduct." However, most of the literature on monetary policy rules have had a more narrow interpretation of a policy rule, namely what can be called an *instrument rule*, in which the central bank's policy instrument, typically a short interest rate, is set as a given function of a given set of observed variables. In particular, the discussion has mostly focused on *simple* instrument rules, in which the policy instrument is set as a function of only a few variables. The best known is the Taylor rule (Taylor, 1993). Similar simple instrument rules can be called Taylor-type rules.

However, other rules are possible, such as *targeting rules*, conditions for (the forecasts of) the target variables. (Svensson (2003, footnote 7) provides references to early work on targeting rules.) One such rule is that policy should be set such that the inflation forecast is close to the inflation target at some specified horizon, such as two years. Another such rule is that the forecasts of the inflation gap and the unemployment gap should have the same sign (Qvigstad, 2005) and not be of too different magnitudes. *Forecast targeting*, discussed here, is a kind of targeting rule.

Instead, optimal policy requires a response to the *determinants* of the future realizations of inflation and employment. These determinants normally include the current levels of inflation, GDP, and employment or unemployment but, importantly, also many other variables and shocks. Second, the relevant information depends on circumstances and changes over time. There is a crucial and beneficial role of *judgment* (information, knowledge, and views outside the scope of a particular model) in modern monetary policy, and the appropriate use of good judgment can dramatically improve monetary policy performance. The use of judgmental adjustments is both desirable in principle and unavoidable in practice (Svensson, 2005). But a Taylor-type rule leaves no room for judgmental adjustments. Third, the beneficial development of monetary policy due to learning and new information will conflict with the legislation of (or commitment to) a particular Taylor-type rule. Finally, in spite of considerable academic work and promotion, no central bank has actually chosen to commit itself to a Taylor-type rule (and prominent central bankers scoff at the idea). In short, a Taylor-type rule is not optimal and too rigid to adapt to changing circumstances.

A possible answer to these problems, in particular to the second one mentioned above, is that a Taylor-type rule should not be followed mechanically. Instead, deviations from the rule are allowed. The rule should be seen as mere "guidelines" for monetary policy. This is the view expressed in the original proposal of Taylor (1993) and, in more detail, in Taylor (2000). A problem with this answer is that the rule is then *incomplete*: some deviations are allowed, but *there are no rules for when deviations from the instrument rules are appropriate*. As discussed in some detail in Svensson (2003), this arguably makes the use of simple instrument rules as mere guidelines for monetary policy too vague to be operational.

What rule for the FOMC's monetary policy setting would then best fulfill the Federal Reserve's mandate over time and also make the Federal Reserve's policy sufficiently transparent so that the Federal Reserve can be held accountable for fulfilling the mandate? This paper argues that the answer to this question is *forecast targeting*, what Bernanke (2015b) briefly describes in the quote at the beginning of this paper.[3] Forecast targeting is setting the policy rate (the federal funds rate) and the policy-rate path so that the resulting forecasts for the Federal Reserve's target variables, inflation and employment (or unemployment) best fulfill the Federal Reserve's mandate of maximum employment and price stability. Forecast targeting also involves publishing and justifying the FOMC's policy-rate path and forecasts for inflation and employment. This serves to best

---

[3] Forecast targeting rather than Taylor-type rules is further discussed and promoted in, for example, Bernanke (2004, 2015a), Kohn (2007, 2012), Qvigstad (2005), Svensson (1997, 2003, 2011), and Woodford (2004, 2007, 2012). The term "inflation-forecast targeting" was introduced in Svensson (1997), and the term "forecast targeting" in Svensson (2003).

implement the selected policy in order to make it credible with the financial market and other economic agents as well as to make it possible to hold the Federal Reserve accountable for fulfilling its mandate.[4]

To better see the rationale for forecast targeting, consider for simplicity a situation of relatively normal times when the Federal Reserve is not doing any active balance-sheet policy but is only using a policy (interest) rate, the federal funds rate, as its policy instrument. Furthermore, assume for simplicity that the labor-market participation rate is independent of monetary policy, so that for monetary policy purposes employment varies negatively one-to-one with unemployment. Then maximum employment corresponds to what FOMC (2017) calls the longer-run normal rate of unemployment, what I will call the (minimum) long-run sustainable unemployment rate. Under this simplification, the Federal Reserve's mandate is to keep inflation close to its target of 2% and unemployment close to its estimated long-run sustainable unemployment rate.

Two important circumstances then need to be taken into account: First, monetary policy actions tend to influence economic activity and prices with a lag. Therefore monetary policy is more effective in fulfilling the mandate if it is guided by *forecasts of future* inflation and unemployment rather than by current inflation and unemployment.

Second, the current policy rate has a very small direct impact on economic activity and prices. What matters for economic activity and prices is instead market *expectations of future* policy rates. These expectations affect longer-term interest rates and asset prices, which in turn have an impact on activity and prices. It is the entire expected path of future policy rate that affects economic activity, not the policy rate over the next few days and weeks. This means that an effective monetary policy decision cannot only consist of setting the current policy rate; it must explicitly or implicitly also involve the selection of a policy-rate path, a forecast of the future policy rate. Not to discuss and select a policy-rate path is an incomplete decision-making process (Svensson, 2007a).

Given this, the rule for the FOMC that best fulfill its mandate is to select a policy rate and a policy-rate path so that the resulting forecasts for inflation and unemployment "look good." Here, "looking good" means best fulfilling the Federal Reserve's mandate, that is, best stabilizing inflation around its target and unemployment around its long-run sustainable rate.

Why is this rule, forecast targeting, better than a Taylor-type rule? First, it takes into account all relevant information available to the Federal Reserve. It takes into account the information

---

[4] Rudebusch and Williams (2008) provide early support for publishing the Federal Reserve's policy-rate projection.

about the economy, economic activity, and prices that has an impact on the forecasts of inflation and unemployment at a given policy-rate path. It also takes into account all relevant information about the transmission mechanism of monetary policy, that is, how changes in the policy-rate path affect the forecasts of inflation and unemployment at given information about the current state of the economy. Second, the rule therefore adapts to new information and changes in circumstances, and it allows for judgmental adjustments. It avoids the restrictiveness and inflexibility of a Taylor-type rule. How the policy rate optimally responds to relevant information, judgment, and new circumstances is far too complex to be represented by a simple formula such as a Taylor-type rule. The selected policy-rate path and forecasts of inflation and unemployment will in practice be a combination of model simulations, sometimes from several models, and judgmental adjustments. [5]

However, for successful implementation and realization of the selected policy, the policy-rate path should be credible in the sense of market expectations being aligned with the policy-rate path. Implementation of monetary policy is largely about the management of expectations (Woodford, 2004). This includes making the *actual* financial conditions align with the *intended* financial conditions, where the latter can be seen as represented by the policy-rate path. Economic agents' expectations of future inflation also matter. If the FOMC manages to make the inflation target credible, in the sense of making economic agents' inflation expectations align with the inflation target, stabilization of inflation around its target is much easier, because actual inflation is much affected by expected inflation. Then it is also easier to stabilize unemployment around the long-run sustainable unemployment rate. The tradeoff between stability of inflation around the target and of unemployment around its long-run sustainable rate becomes more favorable.

The best way to make the policy-rate path credible with the market and general public is arguably to publish the policy-rate path and the forecasts of inflation and unemployment and justify them and the policy decision. Not to publish the policy-rate path would be to hide the most important information (Svensson, 2007a). Thus, forward guidance is the default.[6] In addition to justifying how new information since the last decision has affected the forecasts and the selected policy-rate path, the justification of the decision includes demonstration of why the inflation and unemployment forecasts "look good," that is, best fulfill the Federal Reserve's mandate. If required,

---

[5] The issue of discretion and commitment in forward-looking models and economies is discussed below in section 3.1.

[6] Thus, there is forward guidance in the form a published policy-rate path. Normally, this is a forecast conditional on current information, not a commitment. In exceptional situations, for example, when the Federal Reserve is restricted by the effective lower bound for the policy rate, it may be a commitment through a certain date (time-dependent) or conditional on a specific outcome of inflation or employment (state-dependent). See Bernanke (2017) for a recent discussion. (Because the lower bound for the policy rate is not zero but negative, the *effective* lower bound is a more appropriate term than the *zero* lower bound (Svensson, 2010).)

this can be done by showing that other policy-rate paths than the one selected lead to inflation and unemployment forecasts that look less good, that is, do not fulfill the mandate as well. This can be done more explicitly with the use of what can be called mean squared gaps (MSGs), which quantify the deviation of the inflation forecast from the inflation target and the deviation of the unemployment forecast from the long-run sustainable unemployment rate (Svensson, 2011).

Furthermore, the publication and justification of the FOMC's policy-rate path and inflation and unemployment forecasts make it possible to hold the Federal Reserve accountable for fulfilling the mandate. The policy-rate path and forecasts of inflation and unemployment, the FOMC's justification of them and its fulfillment of its mandate can be scrutinized and reviewed both in real time and ex post by external observers and experts and at the usual hearings in congressional committees (Svensson, 2009, 2012).

Altogether, forecast targeting can be seen as a case of "constrained discretion" (Bernanke and Mishkin, 1997), where the constraint to fulfill the mandate is most explicit.

In the rest of the paper, section 2 discusses the interpretation and specification of the Federal Reserve's mandate. Section 3 discusses how the Federal Reserve can best fulfill its mandate by the decision-making process of forecast targeting and its implementation of the decision. The forecast-targeting policy rule is summarized as three steps in section 3.3. Section 4 discusses the how the Federal Reserve can be held accountable. Section 5 shows an example, from the Riksbank's monetary policy decision in February 2013 (Sveriges Riksbank, 2013), of how alternative policy-rate paths and corresponding forecasts of inflation and unemployment (incuding MSGs) can be used to examine whether the decision best fulfills the mandate. Section 6 includes a discussion of to what extent the Federal Reserve is already practicing forecast targeting. Section 7 [to be extended] provides some conclusions.

2   The mandate

The one-page well-written FOMC "Statement on Longer-Run Goals and Monetary Policy Strategy" (FOMC, 2017, first adopted in January 2012) clarifies the Federal Reserve's monetary policy goals and strategy. The Federal Reserve's statutory mandate can be summarized as to promote maximum employment and price stability.[7] The FOMC has decided that a 2% inflation target is

---

[7] More precisely, the Congress has given the Federal Reserve the statutory mandate "to promote effectively maximum employment, stable prices, and moderate long-term interest rates." Moderate long-term interest rates will normally follow from low and stable inflation.

most consistent over the longer run with its statutory mandate. Regarding maximum employment, the FOMC notes that the maximum level of employment, in contrast to the rate of inflation, is largely determined not by monetary policy but by nonmonetary factors that affect the structure and dynamics of the labor market. These factors may change over time and may not be directly measurable. Consequently, it would not be appropriate to specify a fixed goal for employment; rather, the maximum level of must be estimated from a range of indicators and such estimates are uncertain and subject to revision. An important indicator is the FOMC's estimate of what it calls the longer-run normal rate of unemployment.

The FOMC provides further information on how it sets monetary policy:

> In setting monetary policy, the Committee seeks to mitigate deviations of inflation from its longer-run goal and deviations of employment from the Committee's assessments of its maximum level. These objectives are generally complementary. However, under circumstances in which the Committee judges that the objectives are not complementary, it follows a balanced approach in promoting them, taking into account the magnitude of the deviations and the potentially different time horizons over which employment and inflation are projected to return to levels judged consistent with its mandate. (FOMC, 2017)

Given this, the mandate can be well formalized by a standard quadratic loss function of inflation and employment. If, for simplicity, the labor-market participation rate is assumed to be independent of monetary policy, maximum employment can be replaced by the (minimum) longer-run normal unemployment rate. The mandate can then be expressed in terms of a standard quadratic loss function of inflation and unemployment. Furthermore, a "balanced approach," and the explicit statement of Bernanke (2015b) in the quote at the beginning of this paper can be interpreted as an equal weight on stabilization of inflation and stabilization of unemployment. In particular, Yellen (2012, p. 13) states:

> The balanced-approach strategy endorsed by the FOMC is consistent with the view that maximum employment and price stability stand on an equal footing as objectives of monetary policy.

Then the quarter-t loss, L_t, can be represented by the quadratic loss function,

$$L_t = (\pi_t - \pi^*)^2 + (u_t - u^*)^2, \tag{2}$$

where π_t denotes the inflation rate, π^* denotes the 2% inflation target, u_t denotes the unemployment rate, and u^* denotes the FOMC's (latest) estimate of the longer-run normal unemployment rate, which I will call the (minimum) long-run sustainable unemployment rate. Furthermore, the inflation

rate, π_t, and the unemployment rate, u_t, can be seen as the two *target variables* of monetary policy (by target variables I mean the variables that enter the loss function). Here we should not forget the important difference, mentioned above, that the target for inflation, π^*, is determined by the FOMC, but the target for unemployment, the long-run sustainable unemployment rate, u^*, is *estimated*, not determined, by the FOMC, because it is determined largely by nonmonetary structural factors beyond the control of monetary policy.[8]

In a given quarter t, the mandate for the future can then be formalized as setting monetary policy so as to minimize the intertemporal loss function

$$\mathrm{E}_t \sum_{\tau=0}^{T} \delta^\tau L_{t+\tau} = \mathrm{E}_t \sum_{\tau=0}^{T} \delta^\tau [(\pi_{t+\tau} - \pi^*)^2 + (u_{t+\tau} - u^*)^2], \tag{3}$$

where E_t denotes FOMC expectations conditional on its information in quarter t, T denotes a finite horizon in quarters, and δ is a discount factor that satisfies $0 < \delta \leq 1$ and in practice is very close to or equal to one.[9]

3 Fulfilling the mandate

What rule for the FOMC's monetary policy setting would then best fulfill the Federal Reserve's mandate over time? That is, what rule would minimize the intertemporal loss (3)? Here, given the problems of Taylor-type rules noted in section 1 (and examined in more detail in Svensson (2003)), I consider more general rules, in the sense of a "prescribed guide for monetary policy."

Let us simplify somewhat by considering a situation of normal times, when the Federal Reserve is not doing any active balance-sheet policy but is only using the policy (interest) rate, currently the federal funds rate, as its policy variable. Furthermore, let us, as above, consider inflation and unemployment as the two target variables.[10]

Two important circumstances then need to be taken into account. First, monetary policy actions tend to influence economic activity and prices with a lag. Monetary policy has a small or zero impact on inflation and unemployment in the current quarter. The major impact is in future quarters. Therefore monetary policy is more effective in fulfilling its mandate if it is guided

---

[8] Because the FOMC's estimate of the long-run sustainable rate may change over time, it could be indexed by the quarter of the latest estimate.

[9] The horizon, T, can in theory be infinite, but in practice it is finite, for example, 36 or 60 quarters. A finite horizon also implies that the intertemporal loss function converges not only for $0 < \delta < 1$ but also for $\delta = 1$.

[10] That is, under the assumption that the labor market participation rate is approximately independent of monetary policy. If it is not, the loss function should be expressed in terms of the employment rate instead of the unemployment rate.

by *forecasts of future inflation and unemployment* rather than (estimates of) current inflation and unemployment.[11]

Second, the current policy rate has a very small direct impact on economic activity and prices. What matters for economic activity and prices is instead market expectations of future policy rates. These expectations affect longer-term interest rates and asset prices, which in turn have an impact on activity and prices. It is the entire expected path of future policy rate that affects economic activity, not policy rate over the next few days and weeks.

3.1 The monetary policy decision

It follows that an effective monetary policy decision cannot only consist of setting the current policy rate; it must explicitly or implicitly also involve the selection of an expected path for the future policy rate. Given this, the rule for the FOMC that best would fulfill its mandate is to select a policy-rate path such that, conditional on this path and current information about the economy, the resulting forecasts for inflation and unemployment "look good." Here, by "looking good" I mean best fulfilling the Federal Reserve's mandate, that is, best stabilizing inflation around its target and unemployment around its long-run sustainable rate.

Let me make this a bit more precise with some notation and definitions, following Svensson (2011). First, let $i^t \equiv (i_{t,t}, i_{t+1,t}, ..., i_{t+T,t}) \equiv \{i_{t+\tau,t}\}_{\tau=0}^T$ denote the policy-rate path in the current quarter t. Here $i_{t,t}$ denotes the current policy rate and $i_{t+\tau,t}$ for $\tau = 1, 2, ..., T$ denotes the FOMC's quarter-t forecast of, or plan for, the policy rate in future quarters $t+\tau$. Second, let $\pi^t \equiv \{\pi_{t+\tau,t}\}_{\tau=0}^T$ and $u^t \equiv \{u_{t+\tau,t}\}_{\tau=0}^T$ denote the FOMC's forecasts of inflation and unemployment.[12]

Third, define the forecast loss, $L_{t+\tau,t}$, as

$$L_{t+\tau,t} = (\pi_{t+\tau,t} - \pi^*)^2 + (u_{t+\tau,t} - u^*)^2. \tag{4}$$

It represents the loss from deviations of quarter-t forecasts of quarter-$(t + \tau)$ inflation and unemployment from, respectively, the inflation target and the long-run sustainable unemployment rate.

---

[11] One should remember that current inflation and unemployment are not directly observed in real time. The numbers published by statistics authorities are therefore estimates, "nowcasts," of the "true" current inflation and unemployment.

[12] These forecasts should be (probability) mean forecasts, not modal forecasts. Note that, relative to a modal forecast, a mean forecast can be seen as a risk-adjusted forecast. Mean forecasts are sufficient for optimal policy if the conditions of so-called certainty equivalence are fulfilled (a linear model, additive shocks, and a quadratic loss function). It is not obvious to what extent mean forecast targeting (relying on certainty equivalence and hence only on mean forecasts) is still a good approximation when there is model uncertainty, multiplicative uncertainty, and so on. However, in practice there is usually insufficient information to judge whether policy should be more or less aggressive than the certainty-equivalent one, so the certainty-equivalent policy is then still warranted. The main exception is the nonlinearity caused by the effective lower bound on nominal interest rates. When there is a risk that the effective lower bound will bind in the future, policy should normally be more expansionary than the certainty-equivalent one.

Then the quarter-t intertemporal forecast loss, $\mathcal{L}_t$, is given by

$$\mathcal{L}_t = \sum_{\tau=0}^{T} L_{t+\tau,t} = \sum_{\tau=0}^{T}(\pi_{t+\tau,t} - \pi^*)^2 + \sum_{\tau=0}^{T}(u_{t+\tau,t} - u^*)^2, \tag{5}$$

where the discount factor, δ, for simplicity (and, arguably, for realism) has been set equal to one.

Furthermore, the deviations of inflation forecast from its target and the unemployment forecast from its long-run sustainable rate can be measured by the mean-squared gaps for inflation and unemployment, defined as follows. The intertemporal forecast loss, (5), divided by the horizon, can be written

$$\mathcal{L}_t/T = \text{MSG}_t^\pi + \text{MSG}_t^u, \tag{6}$$

where MSG_t^π and MSG_t^u denote the mean squared gaps for, respectively, inflation and unemployment and are defined as

$$\text{MSG}_t^\pi \equiv \sum_{\tau=0}^{T}(\pi_{t+\tau,t} - \pi^*)^2/T, \tag{7}$$

$$\text{MSG}_t^u \equiv \sum_{\tau=0}^{T}(u_{t+\tau,t} - u^*)^2/T. \tag{8}$$

Thus, the MSG for a variable is the average deviation of the forecast of the future variable from the target for the variable. A smaller MSG for a variable indicates better mandate fulfillment for the variable, with a zero mean squared gap indicating (unlikely) perfect mandate fulfillment.[13]

Given this, the rule for the FOMC that best would fulfill its mandate is to select a policy-rate path, i^t, so that that, conditional on this path and current information about the economy and prices, the shocks hitting the economy, and the transmission mechanism of monetary policy, the resulting forecasts for inflation, π^t, and unemployment, u^t, "look good". Here, "looking good" means "mandate-consistent," in the sense of mitigating the deviations of the inflation and unemployment forecasts from, respectively, the inflation target and the long-run sustainable unemployment rate; more precisely, minimizing the sum of the MSGs of inflation and unemployment, (6). Equal weight on the MSGs indicate a "balanced approach."[14] [15]

---

[13] Division by the horizon T to get mean squared gaps instead of cumulative squared gaps is not necessary but allows a convenient analogy with the well-known concept of mean squared errors in statistics.

[14] Forecasts of inflation and unemployment can be generated with the methods of unanticipated policy interventions by Leepern and Zha (2003) or anticipated alternative policy-rate paths by Laséen and Svensson (2011), or a combination of the two methods. Svensson (2005) shows how to incorporate judgment in a systematic way.

[15] With a finite but relatively long horizon T, one can add a terminal condition, such as policy shifting to an optimal reaction function or the forecasts of inflation and unemployment reaching, respectively, the inflation target and long-run sustainable unemployment rate, that is, $\pi_{t+T,t} = \pi^*$ and $u_{t+T,t} = u^*$, see Laséen and Svensson (2011) and Svensson and Tetlow (2005).

There is a technical issue that may need to be handled. In forward-looking models, there is a well-known time-consistency problem which implies that optimization under commitment, which involves some history-dependence of policy, may be better than optimization under discretion. Woodford (1999) has suggested optimization "in a timeless perspective" as a possible solution to this. As discussed in detail in Svensson and Woodford (2005) and Svensson (2011), this can be handled by a modification of the intertemporal forecast loss, (5), that incorporates the desired history dependence. Alternatively, as discussed in Giannoni and Woodford (2003) and Svensson and Woodford (2005), a restriction on the policy-rate path and the projections can be added. If this issue is deemed to be of relevance, it can be handled by Federal Reserve staff taking it into account when presenting alternative policy alternatives to the FOMC. But it is not clear to me that under normal circumstances the time-consistency problem in forecast targeting is of sufficient importance to warrant explicit treatment.

However, when the policy rate is restricted by the effective lower bound, which is not zero but negative and not hard but soft (Svensson, 2010), a commitment to a policy-rate "lower for longer" is normally more effective in stimulating the economy by lowering longer-term interest rates. Such a commitment may involve a significant time-consistency problem. Enforcing a commitment in such situations is discussed in some detail in Bernanke (2017), including the role of a temporary price-level target.

Note that setting monetary policy to minimize the deviations of the *forecasts* from their targets means that the forecasts of inflation and unemployment are effectively used as *intermediate* target variables for inflation and unemployment, the actual target variables. Using forecasts as intermediate target variables justifies the name *forecast targeting*.[16]

This decision-making process means that the monetary policy decision takes into account all relevant new and old information available to the FOMC, including information about the economic activity and prices, the inferred shocks hitting the economy, and how the inflation and unemployment forecasts depend on the policy-rate path, that is, the transmission mechanism of monetary policy.

More precisely, the decision-making process means that new information is "filtered through the forecasts," and such filtering determines what information is relevant for the decision. New information that for a given policy-rate path affects the forecasts of inflation and unemployment is

---

[16] The idea that inflation targeting implies that the inflation forecast can be seen as an intermediate target was introduced in King (1994). The term "inflation-forecast targeting" was introduced in Svensson (1997), and the term "forecast targeting" in Svensson (2003).

relevant for the decision; new information that doesn't affect the forecasts for a given policy-rate path is not relevant for the decision.

Furthermore, this decision-making process involves continues updating and learning about the state and working of the economy and the transmission process of monetary policy. Indeed, I would like to argue that this the decision-making process is fully consistent with what is called Bayesian learning and Bayesian optimal policy. A Bayesian optimal policy involves in this context not only choosing a policy-rate path (and any other policy instruments) so as to minimize an intertemporal loss function of expected discounted future quadratic losses, conditional on all relevant prior and new information, including all information about the state of the economy and the outlook for relevant exogenous variables, and learning by Bayesian signal extraction and updating. It also includes taking into account the possible models of the transmission mechanism and the probabilities that they are correct, other aspects of model uncertainty, judgment, scientific evidence, practical experience, and so on. Indeed, such Bayesian optimal policy is arguably the most robust monetary policy among available alternatives.[17]

3.2 Implementation

The decision selects the policy-rate path and inflation and unemployment forecast that, *if believed by the market and other economic agents*, best fulfill the mandate.

A successful implementation of the selected policy involves making market expectations align with the policy-rate path. The policy-rate path can be seen as the FOMC's *intended* monetary policy, or *intended* financial conditions. Market expectations of future policy rates and resulting market yield curves for different assets can be seen as the *actual* monetary policy, the *actual* financial conditions. The implementation of monetary policy involves making the actual financial conditions equal to the intended financial conditions.

However, not only market expectations of the future policy rate but also economic agents' expectations of future inflation, unemployment, GDP and other economic variables matter. In particular, if the FOMC manages to make the inflation target credible, in the sense of making economic agents' inflation expectations align with the inflation target, stabilization of inflation around its target is much easier, because economic agents' individual decisions that result in (economy-wide) inflation are much influenced by the agents' expectations of (economy-wide) inflation.[18]

---

[17] See Svensson (2013) for more discussion of this point.

[18] See Svensson and Woodford (2005) for details.

The best way to make the policy-rate path and inflation forecasts credible is arguably to publish them and justify the decision. Not to publish the policy-rate path would be to hide the most important information (Svensson, 2007a). In addition to justifying how new information since the last decision has affected the forecasts and the selected policy-rate path, the justification of the decision may include the publication of inflation and unemployment forecasts for alternative policy-rate paths different from the selected one and the demonstration that these forecasts do not fulfill the mandate to the same degree. That demonstration may use mean squared gaps for inflation and unemployment as quantitative measures of the degree of mandate fulfillment.

3.3 The forecast-targeting rule summarized

The forecast-targeting rule can be summarized as these three steps.

1. For a given policy-rate path (for example, the policy-rate path from the previous decision), construct new inflation and unemployment forecasts, taking into account new information received since the previous decision.

2. If the new inflation and unemployment forecasts "look good" (meaning best fulfilling the mandate), select the given policy-rate path as the decision; if the new inflation and unemployment forecasts do not look good, adjust the policy-rate path so that they do look good.

3. Publish the policy-rate path and inflation and unemployment forecasts and justify the decision in order to make the published path and forecasts credible, that is, to make market and other economic agents' expectations agree with the published path and forecasts. The justification of the decision may include the publication of inflation and unemployment forecasts for alternative policy-rate paths different from the selected one and the demonstration that these forecasts do not fulfill the mandate to the same degree. MSGs for inflation and unemployment as quantitative measures of the degree of mandate fulfillment may be used.

4 Accountability

Can the FOMC be held accountable if it practices forecast targeting? Yes, forecast targeting can be scrutinized and reviewed by external observers if the Fed provides enough information. The Fed needs to publish and justify that the policy-rate path and forecasts of inflation and unemployment are internally consistent and consistent with available information about the economy and its

structure and dynamics. It also needs to demonstrate that alternative policy-rate paths, typically representing, respectively, tighter and easier policy than the selected policy, result in worse mandate fullfillement than the selected policy. These explanations, justifications, and demonstrations can be scrutinized and reviewed both in real time and ex post by external observers and experts and at the regular hearings in the Congressional oversight committees (Svensson, 2009, 2012).

5   An example: Reviewing the policy decision

A published policy-rate path and forecasts of inflation and unemployment allows a review of the policy decision, especially if the result from alternative policy-rate paths is also published. An obvious criterion for an appropriate policy-rate path is that it should not be the case that a lower or higher policy-rate path leads to better mandate fulfillment.[19]

It is possible to review this with the aid of a figure such as figure 1, which is figure 4 in the Riksbank minutes from the policy meeting of February 2013 (Sveriges Riksbank, 2013). It is one of the similar four-panel figures that I regularly brought to the Riksbank policy meetings during my term as a deputy governor and member of the Executive Board. The figures were published in the Riksbank's minutes. The four panels show the repo-rate path (top left, the repo rate is the Riksbank's policy rate), the MSGs for inflation and unemployment (bottom left), the forecast of the CPIF inflation rate (top right, CPIF inflation is CPI inflation when mortgage rates are held constant), and the forecast of the unemployment rate (bottom right).
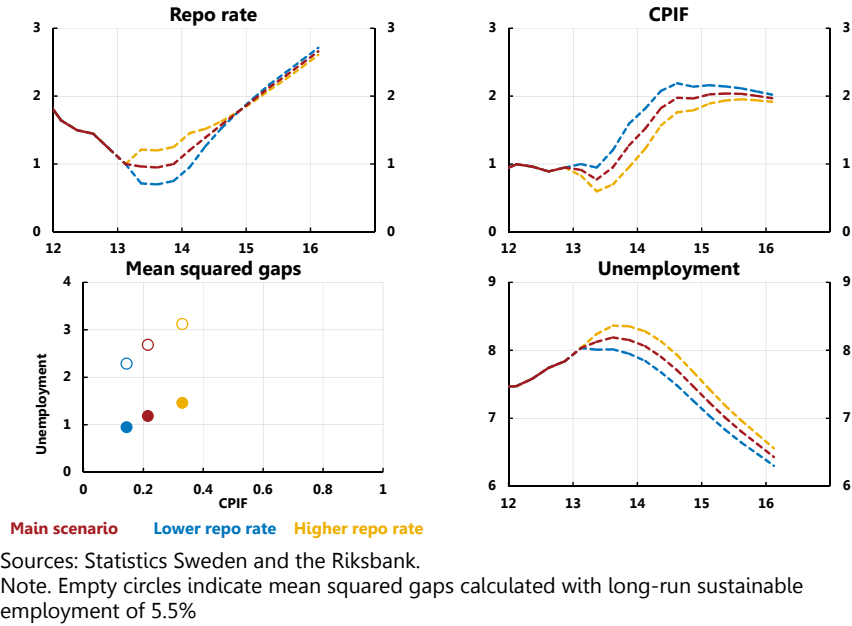
The center red lines refer to the majority's choice of a repo-rate path and resulting forecasts of inflation and unemployment. The red circles in the bottom-left panel show the corresponding MSG points with the coordinates of the MSG for inflation measured along horizontal axis and the MSG for unemployment measured along vertical axis. The filled and unfilled circles refer to MSG points calculated with a long-run sustainable unemployment rate of, respectively, 6.25% and 5.5% (the estimates of the majority and me, respectively). The inflation target is 2%.

The blue and yellow lines refer to, respectively, a lower and a higher repo-rate path and corresponding forecasts of inflation and unemployment. It is obvious that the lower repo-rate path is better than the majority choice; the forecast of inflation is higher and closer to the target of 2% and the forecast of unemployment is lower and closer to the long-run sustainable unemployment rate, regardless of whether the latter is 6.25% or 5.5%. Consistent with this, the MSG points for

---

[19] This can be seen as a simple application of the so-called Calculus of Variations in optimization theory: A different policy should not give a better outcome.

Figure 1: Monetary policy alternatives around the main scenario.
Source: Sveriges Riksbank (2013, figure 4).

Figure 4. Monetary policy alternatives around the main scenario
Effects according to RAMSES, partly expected monetary policy shocks.
Policy rates abroad according to the main scenario. Long-run sustainable unemployment
6.25 %

Main scenario   Lower repo rate   Higher repo rate

Sources: Statistics Sweden and the Riksbank.
Note. Empty circles indicate mean squared gaps calculated with long-run sustainable
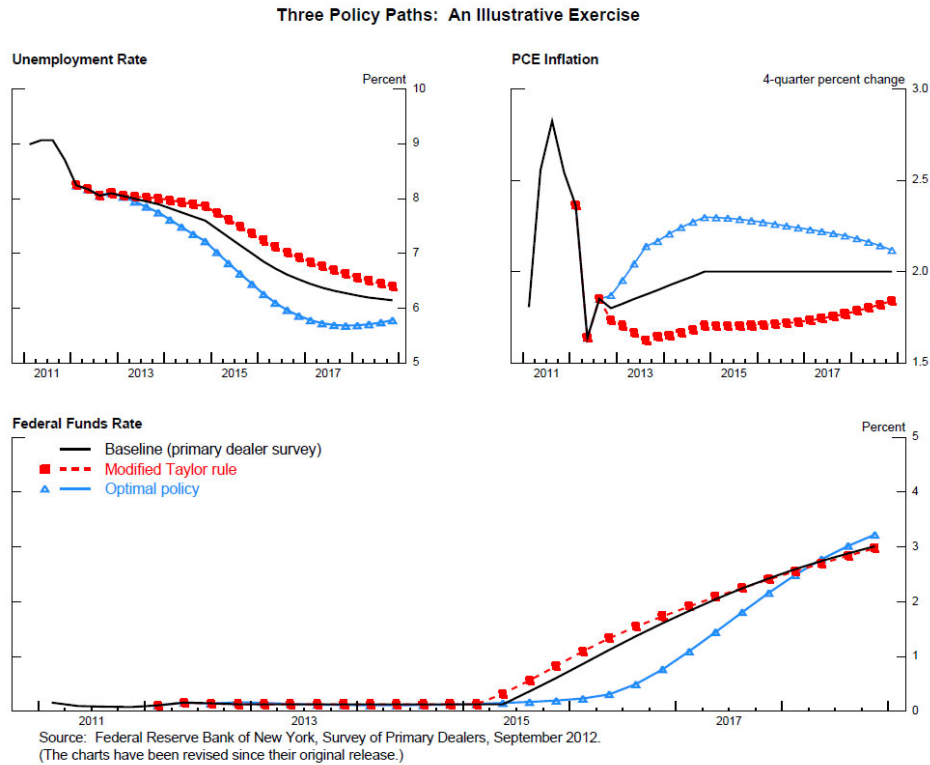employment of 5.5%

the lower repo-rate path, the blue circles in the bottom-left panel, are southwest of the MSG points for the majority's repo-rate path.

In this trivial (but real-world) case, the MSG points are not needed for judging that the lower repo-rate path is better than the center repo-rate path. In this case, a lower policy-rate path fulfills the mandate better for both inflation and unemployment; there is no tradeoff. It is also obvious that an even lower policy-rate path would be better than the blue path in in the top-left panel.

In a non-trivial case, there would be a tradeoff between stabilizing inflation and unemployment. For example, the forecasts of inflation and unemployment would both be above (or both be below), respectively, the inflation target and the long-run sustainable unemployment rate. Then the alternative MSG points for a given long-run sustainable unemployment rate would not line up southwest-northeast but northwest-southeast, and the best repo-rate path would be the one minimizing the sum of the MSGs.[20] Indeed, a necessary condition for a policy-rate path to be a candidate for best fulfilling the mandate is that alternative policy-rate paths result in MSG points

---

[20] Iso-loss lines with a slope of minus one, corresponding to equal weight on the MSGs for inflation and unemployment, can be added to the bottom-left panel. Then the best repo-rate path is the one for which the MSG point lies on the iso-loss line that is closest to the origin.

Figure 2: Three Policy Paths: An Illustrative Exercise. Source: Yellen (2012).

Three Policy Paths: An Illustrative Exercise

Source: Federal Reserve Bank of New York, Survey of Primary Dealers, September 2012.
(The charts have been revised since their original release.)

northwest and southwest of the candidate's MSG point.[21] [22]

Clearly, a published policy-rate path and corresponding forecasts of inflation and unemployment gives external observers and experts considerable possibilities to review how well the Federal Reserve fulfills its mandate and to holding it accountable for it.

The discussion in Yellen (2012) of revolution and evolution in communication by central banks is very relevant here, in particular the figure of three policy-rate paths and the resulting forecasts of inflation and unemployment shown in figure 2. In particular, a fourth panel can be added with the MSG points for the different policy-rate paths.

---

[21] This discussion does not take into account some issues of time-consistency and commitment in forward-looking models, which are discussed and resolved in detail in Svensson and Woodford (2005) and Svensson (2011). My own experience of practical policymaking indicate that those issues are in most cases more of theoretical than practical importance, but there are possible situations, not discussed here, when they need to be taken into account. See also the discussion in section 3.1 and, for details, Svensson (2011).

[22] Furthermore, in this real-world case, the majority's forecasts of inflation and unemployment in figure 1 were conditional on the majority's assumption of a high forecast of foreign interest rates, much above implied forward rates. As shown in Sveriges Riksbank (2013, figure 5), assuming a lower forecast of foreign interest rates, in line with implied forward rates, resulted for a given policy-rate path in a stronger exchange-rate forecast and thereby an even lower inflation forecast and an even higher unemployment forecast. Then an even lower repo-rate path was called for, which I dissented in favor of. See the minutes (Sveriges Riksbank, 2013) for details. The minutes are *attributed*; thus, in Sweden individual members of the Executive Board can be held accountable not only for their votes and decisions but also for their individual statements and arguments at the policy meeting, regardless of whether they are dissenters or not.

6 Does the Federal Reserve already practice forecast targeting?

Forecast targeting can be summarized by the three steps in section 3.3. To what extent is the Federal Reserve already practicing forecast targeting as proposed in this paper? The Federal Reserve staff's optimal-control simulations described and discussed in Brayton, Laubach, and Reifschneider (2014) and used for example in Yellen (2012) and the optimal policy projections discussed in Svensson and Tetlow (2005) lend themselves well to steps 1 and 2, the selection of an appropriate policy-rate path. Regarding step 3, the publication and justification of the decision, the FOMC is already publishing its *Summary of Economic Projections* (SEP), which include economic projections of the FOMC participants under their individual assessments of projected appropriate monetary policy.

These projections receive considerable emphasis in the Chair's press conference after policy meetings. For example, as Chair Bernanke noted in his opening remarks at the press conference on April 27, 2011 (before the publication of interest-rate projections, which began in January 2012):

> The Committee's economic projections provide important context for understanding today's policy action as well as the Committee's general policy strategy. Monetary policy affects output and inflation with a lag, so current policy actions must be taken with an eye to the likely future course of the economy. Thus the Committee's projections of the economy, not just current conditions alone, must guide its policy decisions. The lags with which monetary policy affects the economy also imply that the Committee must focus on meeting its mandated objectives over the medium term, which can be as short as a year or two but may be longer, depending on how far the economy is initially from conditions of maximum employment and price stability. (Bernanke, 2011, pp. 4–5)

For another example of the use of the projections, in June 2010 the FOMC's projections for underlying inflation were below the mandate-consistent level, and its projections for unemployment were above the estimate of the sustainable unemployment rate. Indeed, with reference to these circumstances, Chair Bernanke (2010) concluded:

> Given the Committee's objectives, there would appear—all else equal—to be a case for further action.

However, the median projections of the federal funds rate, inflation, and unemployment in the SEP are obviously conceptually different from the forecast-targeting policy-rate path and forecasts of inflation and unemployment discussed above. The projections are submitted by the FOMC participants before the FOMC meeting and are thus not affected by the discussion and decision at the meeting. They are not the result of a joint FOMC decision. The median SEP projections are the medians of the modal projections of each individual FOMC participant (that is, voter or

non-voter) rather than of each individual member (voter). It thus gives equal weight to voters and non-voters. Furthermore, all voters need not have the same weight in the decision; in particular, the Chair has more weight than others in the decision.

Also, the median projections of the federal funds rate, inflation, and unemployment are inconsistent, in the sense that they are not the projections of the median participant but may consist of a combination of projections of different participants, combinations that are likely to vary across the federal funds rate, inflation, and unemployment. In addition, the participants may have different models of the economy and the transmission of monetary policy. Thus, the median projection of the federal funds rate is generally not consistent with the median forecasts of inflation and unemployment. Publishing participants' initials with the projections would provide more information and moderate some of these problems.

However, even if the SEP is conceptually different from the forecast-targeting policy-rate path and forecasts of inflation and unemployment, it is not clear how quantitatively different they are from a joint FOMC decision. Majority voting about paths in a committee may result in medians consisting of sections from different committee members, but it is not clear whether this would be problem of quantitative importance.[23] But it is clear that the SEP is more of a snapshot of the views of the FOMC and not a conscious choice by the FOMC.

A decision-making process whereby the FOMC arrives at an explicitly joint policy-rate path and corresponding inflation and unemployment forecasts would be much preferable. It is natural that such a process faces difficulties when the FOMC also decides on balance-sheet policies and thus has several policy instruments. However, when the balance-sheet reduction is set on autopilot and the FOMC has the federal funds rate as its one policy instrument, perhaps such a decision-making process is possible and can be followed.

Nevertheless, forecast targeting is arguably to a considerable extent already being practiced with the current median projections in the SEP, as the quotes from Bernanke (2010, 2011, 2015b) suggest. Furthermore, the FOMC can to some extent be held accountable in real time with the current SEP. With some reservations due to the problems mentioned, it is possible to compare the median projection of the federal funds rate with market expectations and the median projections of inflation and unemployment with, respectively, the 2% target and the FOMC's estimate of the long-run sustainable rate and assess whether the FOMC is best fulfilling the mandate.

---

[23] Svensson (2007b) discusses majority voting on forecast paths and argues that they are completely feasible and already occurring in a few central banks.

7 Conclusions

This paper has provided reasons why forecast targeting is likely to be the most appropriate policy rule to fulfill the Federal Reserve's mandate to promote maximum employment and price stability. Forecast targeting means selecting a policy rate and policy-rate path so that the forecasts of inflation and employment (or unemployment) "look good," in the sense of best stabilizing inflation around the Federal Reserve's target of 2% and employment around the economy's maximum sustainable employment rate. Forecast targeting also involves publishing the policy-rate path and the forecasts of inflation and employment (or unemployment) and, importantly, explaining and justifying them. The justification may involve demonstrations that other policy-rate paths would lead to worse mandate fulfillment. Publication and justification will contribute to making the policy-rate path and the forecasts credible with the financial market participants and other economic agents and thereby more effectively implement the FOMC's policy. Importantly, with such information made public, external observers can review FOMC policy, both in real time and after the outcomes for inflation and employment have been observed. This way the Federal Reserve can be held accountable for fulfilling its mandate. In contrast to simple policy rules that rely on very partial information in a rigid way, such as a Taylor-type rule, forecast targeting allows all relevant information to be taken into account and has the flexibility and robustness to adapt to new circumstances.

References

Bernanke, Ben S. (2004), "The Logic of Monetary Policy," speech at the National Economists Club, Washington, DC, December 2, Federal Reserve Board, www.federalreserve.gov.

Bernanke, Ben S. (2010), "Monetary Policy Objectives and Tools in a Low-Inflation Environment," speech at the conference Revisiting Monetary Policy in a Low-Inflation Environment, Federal Reserve Bank of Boston, Boston, October 15, 2010, Federal Reserve Board, www.federalreserve.gov.

Bernanke, Ben S. (2011), "Transcript of Chairman Bernanke's Press Conference, April 27, 2011," www.federalreserve.gov, Federal Reserve Board.

Bernanke, Ben S. (2015a), "The Future of Monetary Policy," blog post, April 7, 2015, Brookings Institution, available at www.brookings.edu.

Bernanke, Ben S. (2015b), "Remarks at the Brookings Institution on the FORM Act," video clip, Brookings Institution, www.youtube.com/watch?v=KJmA5JDNpKg&t=20.

Bernanke, Ben S. (2017), "Monetary Policy in a New Era," prepared for the conference on Rethinking Macroeconomic Policy, Peterson Institute, Washington, DC, October 12–13, 2017, Brookings Institution.

Bernanke, Ben S., and Frederic S. Mishkin (1997), "Inflation Targeting: A New Framework for Monetary Policy," *Journal of Economic Perspectives* 11(Spring), 97–116.

Brayton, Flint, Thomas Laubach, and David Reifschneider (2014), "Optimal-Control Monetary Policy in the FRB/US Model," FEDS Notes, November 21, Federal Reserve Board, https://www.federalreserve.gov/econresdata/notes/feds-notes/2014/optimal-control-monetary-policy-in-frbus-20141121.html.

Federal Reserve Board (2017), "Monetary Policy Rules and Their Role in the Federal Reserve's Policy Process," *Monetary Policy Report* July 7, 2017, 36–39.

FOMC (2017), "Statement on Longer-Run Goals and Monetary Policy Strategy," adopted effective January 24, 2012, as amended effective January 31, 2017, Federal Reserve Board.

Giannoni, Marc P., and Michael Woodford (2003), "Optimal Interest-Rate Rules: I. General Theory," NBER Working Paper No. 9419.

King, Mervyn (1994), "Monetary Policy in the UK," *Fiscal Studies* 15(3), 109–128.

Kohn, Donald L. (2007), "John Taylor Rules," speech in Dallas, October 12, Federal Reserve Board.

Kohn, Donald L. (2012), "It's Not So Simple," in Koenig, Evan, Robert Leeson, and George A. Kahn (eds.), *From the Great Moderation to the Great Deviation: A Round-Trip Journey Based on the Work of John B. Taylor*, chap. 7, Hoover Institution Press, 173–182.

Laséen, Stefan, and Lars E.O. Svensson (2011), "Anticipated Alternative Instrument-Rate Paths in Policy Simulations," *International Journal of Central Banking* 7(3), 1–35.

Leepern, Eric M., and Tao Zha (2003), "Modest Policy Interventions," *Journal of Monetary Economics* 50(8), 1673–1700.

Qvigstad, Jan F. (2005), "When does an interest rate path "look good"? Criteria for an appropriate future interest rate path - A practician's approach," Staff Memo No. 2005/6, Norges Bank.

Rudebusch, Glenn D., and John C. Williams (2008), "Revealing the Secrets of the Temple: The Value of Publishing Central Bank Interest Rate Projections," in Campbell, John Y. (ed.), *Asset Prices and Monetary Polic*, chap. 6, Chicago University Press, 247–284.

Svensson, Lars E.O. (1997), "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets," *European Economic Review* 41(6), 1111–1146.

Svensson, Lars E.O. (2003), "What Is Wrong with Taylor Rules? Using Judgment in Monetary Policy through Targeting Rules," *Journal of Economic Literature* 41(2), 426–477.

Svensson, Lars E.O. (2005), "Monetary Policy with Judgment: Forecast Targeting," *International Journal of Central Banking* 1(1), 1–54.

Svensson, Lars E.O. (2007a), "Monetary Policy and the Interest Rate Path," speach at Danske Bank, Stockholm, August 22, Sveriges Riksbank, available at www.larseosvensson.se.

Svensson, Lars E.O. (2007b), "Optimal Inflation Targeting: Further Developments of Inflation Targeting," in Mishkin, Frederic, and Klaus Schmidt-Hebbel (eds.), *Monetary Policy under Inflation Targeting*, vol. 11 of *Central Banking, Analysis, and Economic Policies*, Central Bank of Chile, 187–225.

Svensson, Lars E.O. (2009), "Evaluating Monetary Policy," speech in Uppsala, March 13, Sveriges Riksbank, available at www.larseosvensson.se.

Svensson, Lars E.O. (2010), "Monetary Policy and Financial Markets at the Effective Lower Bound," *Journal of Money, Credit and Banking* 42 Supplement, 229–242.

Svensson, Lars E.O. (2011), "Inflation Targeting," in Friedman, Benjamin M., and Michael Woodford (eds.), *Handbook of Monetary Economics, Volume 3b*, chap. 22, Elsevier, 1237–1302.

Svensson, Lars E.O. (2012), "Evaluating Monetary Policy," in Koenig, Evan, Robert Leeson, and George A. Kahn (eds.), *From the Great Moderation to the Great Deviation: A Round-Trip Journey Based on the Work of John B. Taylor*, chap. 10, Hoover Institution Press, 245–274, available at www.larseosvensson.se.

Svensson, Lars E.O. (2013), "Discussion of 'Complexity and Monetary Policy'," *International Journal of Central Banking* 9(S1), 205–218.

Svensson, Lars E.O., and Robert J. Tetlow (2005), "Optimal Policy Projections," *International Journal of Central Banking* 1(3), 177–207.

Svensson, Lars E.O., and Michael Woodford (2005), "Implementing Optimal Policy through Inflation-Forecast Targeting," in Bernanke, Ben S., and Michael Woodford (eds.), *The Inflation-Targeting Debate*, University of Chicago Press, 19–83.

Sveriges Riksbank (2013), "Minutes of Monetary Policy Meeting," February 12, Sveriges Riksbank.

Taylor, John B. (1993), "Discretion vs Policy Rules in Practice," *Carnegie-Rochester Conference Series on Public Policy* 195–214.

Taylor, John B. (2000), "Using Monetary Policy Rules in Emerging Economies," in *Stabilization and Monetary Policy: The International Experience*, Bank of Mexico, 441–457.

U.S. Congress (2015), "Fed Oversight and Modernization Act of 2015, H.R. 3189," passed House of Representatives November 19, U.S. Congress, https://www.congress.gov/bill/114th-congress/house-bill/3189.

Woodford, Michael (1999), "Commentary: How Should Monetary Policy Be Conducted in an Era of Price Stability?" in *New Challenges for Monetary Policy*, Federal Reserve Bank of Kansas City, 277–316.

Woodford, Michael (2004), "Inflation Targeting and Optimal Monetary Policy," *Federal Reserve Bank of St. Louis Review* 86(4), 15–41.

Woodford, Michael (2007), "The Case for Forecast Targeting as a Monetary Policy Strategy," *Journal of Economic Perspectives* 21(4), 3–24.

Woodford, Michael (2012), "Forecast Targeting as a Monetary Policy Strategy: Policy Rules in Practice," in Koenig, Evan, Robert L. Leeson, and George A. Kahn (eds.), *From the Great Moderation to the Great Deviation: A Round-Trip Journey Based on the Work of John B. Taylor*, chap. 8, Hoover Institution Press, 185–233.

Yellen, Janet L. (2012), "Revolution or Evolution in Central Bank Communications," speech at the Hass School of Business, University of California, Berkeley, November 13, Federal Reserve Board, www.federalreserve.gov.

Yellen, Janet L. (2015), "Letter to Paul Ryan and Nancy Pelosi," November 16, Federal Reserve Board.