Discussion of "Complexity and Monetary Policy"[*]

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1.   Introduction

Let me first say that I was very happy and grateful to receive the invitation to this conference because it gave me the opportunity to honor Don Kohn and his great career at the Federal Reserve. I have tremendously enjoyed talking to and discussing with Don over the years. We have not always agreed, but I have always learned from listening to him, and I will always remain a deep admirer of Don's. In particular, I have found it very interesting and fun to debate the pros and cons of inflation targeting with Don a few times.

One such occasion was an April 2005 symposium at the Center for Economic Policy Studies at Princeton University, on the topic "The Future of the Federal Reserve." The list of participants was fantastic: Don, Alan Blinder, Al Broaddus, Steve Cecchetti, Ed Gramlich, Burt Malkiel, Bill Poole, and Tony Santomero. There were three panels and three topics. The first panel was on the topic "Should the Fed Adopt Inflation Targeting?" with Don, Tony (who was then president of the Federal Reserve Bank of Philadelphia), and me on the panel. It was a great debate and great fun. Don was quite skeptical about inflation targeting, whereas Tony was mildly in favor of inflation targeting, if I remember correctly, and I was—no surprise—quite enthusiastic.

Don left the Federal Reserve before it announced its new infla-
tion target of 2 percent in January, but somehow I feel that Don
does not object to this development. Before this, the Federal Reserve
had taken some other major steps towards greater transparency. For
instance, in November 2007 Chairman Bernanke (2007) explained
that the Federal Open Market Committee (FOMC), guided by a
subcommittee chaired by Don, would start publishing enhanced pro-
jections of growth, inflation, and unemployment. And last January,
an explicit inflation target and policy rate projections were added to
the list, moving the Federal Reserve to the frontline of transparent,
flexible inflation targeting in line with its dual mandate of stable
prices and maximum employment.

Thank you, Don, for many great and enjoyable discussions and
debates over the years, and for teaching me so much! And I am look-
ing forward to many future discussions on both monetary policy and
financial stability, given your new job as a member of the Bank of
England's Financial Stability Committee.

Turning to the paper by Athanasios Orphanides and Volker
Wieland, we all know that they have made great contributions to
macroeconomics and monetary policy in several influential papers
which have rightly been widely read and discussed. The new paper
for this conference presents a very valuable study of the performance
of simple instrument rules in a number of different models of the euro
area. Although it is very useful to know how the different instrument
rules work in different models, no clear policy conclusions follow from
Athanasios's and Volker's study. No simple instrument rule performs
well in all reasonable models or is clearly better than the others.

2.   Some Problems with the Approach

However, I must admit that I am not convinced that searching for a
simple instrument rule that works reasonably well in several differ-
ent models is the best approach to practical monetary policy. This
is for several reasons. First, a simple instrument rule is a policy rule
that makes the policy instrument, normally the policy rate, a sim-
ple function of a few variables, such as inflation and output. But
this means that a simple instrument rule uses only part of the avail-
able information and disregards a substantial amount of information
that is highly relevant for monetary policy. This seems especially true

during the financial crisis. Second, the evaluation of the performance of the instrument rules in Athanasios's and Volker's paper implicitly treats the choice of an instrument rule as a once-and-for-all choice. That is, the simple instrument rule is chosen at the beginning of time and then followed forever. More specifically, there is no updating of information, no reestimation of models, no learning about the transmission mechanism and what model is more likely, and no updating of the appropriate instrument rule. Such updating would make the assumption of perfect credibility of the instrument rule in forward-looking models even less plausible.

This is very different from the actual practice of monetary policy. Indeed, central banks as far as I know them do not follow once-and-for-all chosen instrument rules. Indeed, they don't follow instrument rules, period. At most, they compare their actual policy decisions to those recommended by a number of different instrument rules, but they normally deviate from those recommendations.

If the central bank were to use a simple rule, a simple *targeting* rule would make more sense. A targeting rule specifies a condition to be fulfilled by the central bank's target variables, or forecasts thereof.[1] One such example is a criterion for the central bank's target variables formulated by the Bank of Norway Deputy Governor Jan Qvigstad (2005). When applied to inflation and unemployment, this criterion says that normally, the inflation gap (the gap between the actual rate of inflation and the inflation target) and the unemployment gap (the gap between the rate of unemployment and the long-run sustainable rate of unemployment) should have the same sign.

3.   The Uncertainty about Potential Output Is Often Misunderstood

The paper emphasizes the uncertainty about the output gap, the gap between actual output and potential output. I agree that the uncertainty about, and also the conceptual arbitrariness of, potential output makes the output gap less useful in monetary policy (see below). But I am afraid that the uncertainty about potential output nevertheless is often misunderstood. First, large and serially

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[1]See Giannoni and Woodford (2005) and Svensson and Woodford (2005).

correlated errors and revisions of potential output are often mentioned in Athanasios's papers as indicating serious problems with estimates of potential output. But serially correlated errors and revisions do not by themselves indicate that the original estimate is biased, inefficient, or otherwise wrong. Kalman-filter estimates are unbiased and efficient, but the measurement errors and revisions that follow from them are normally serially correlated. Second, in the Phillips curve and in the central bank loss function, potential output enters additively, since the output gap is output less potential output. That means that the uncertainty about potential output is so-called additive uncertainty. This in turn means that potential-output uncertainty by itself is fully consistent with the certainty-equivalence theorem—that for a linear model, a quadratic loss function, and additive uncertainty, the mean estimate of potential output is all that matters for monetary policy, and the uncertainty of the estimate is irrelevant for policy.

Normally monetary policy involves modest changes in the policy instrument and modest disturbances. Then a linear approximation of the model is reasonably good. A quadratic loss function can be seen as a second-order approximation to more general policy preferences. If the policy preferences are symmetric, which seems reasonable, a second-order approximation should be good enough. Certainly, when preferences concern the stability of a variable, a quadratic loss function is natural. It is true that model uncertainty and parameter uncertainty are not forms of additive uncertainty, but as argued below, there is still normally not sufficiently precise information about the nature of the uncertainty to warrant deviation from the certainty-equivalent policy response, that is, the policy response motivated by the mean forecasts of the target variables, mean forecast targeting.

In this context it is important to distinguish indicators of potential output, the observed variables that are correlated with the unobserved potential output, from the actual estimate of potential output. The optimal policy response to the indicators depends on the variance of their measurement errors, whereas the response to the actual estimate of potential output does not and is the same as if potential output were known with perfect certainty. This is sorted out in Svensson and Woodford (2003). We even have a specific numerical example explaining why Athanasios is not right in some of his writings.

4. Best-Practice Monetary Policy

Athanasios and Volker emphasize the complexity of monetary policy. However, I would argue that although the *practice* of monetary policy can be complex and difficult, the *principles* of good monetary policy are actually very simple.

A good monetary policy framework has as its objective both price stability and the stability of the real economy. The mandates of the Federal Reserve and the Riksbank are in line with this.

The dual mandate for the Federal Reserve is, according to the Federal Reserve Act, to promote maximum employment and stable prices. As explained in Svensson (2012b), the mandate for the Riksbank's flexible inflation targeting that follows from the Riksbank Act and the government bill that proposed the act is price stability and the highest sustainable employment. This means that the Federal Reserve and the Riksbank shall stabilize inflation around an inflation target and employment around its highest sustainable rate. In practice the latter means stabilizing unemployment around the lowest long-run sustainable rate (the natural rate).[2]

Furthermore, in practice, the mandates of the Federal Reserve and the Riksbank amount to "(mean) forecast targeting," that is, choosing a policy rate path (or, under special circumstances, using unconventional policy instruments) that results in mean forecasts for inflation and unemployment that best stabilize these around the inflation target and an estimate of the long-run sustainable rate, respectively (Svensson 2005, 2011, Woodford 2007). This means using and implicitly responding to all relevant new and old information that has an impact on the forecasts of inflation and unemployment.[3]

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[2]To be precise, stabilizing employment around a long-run sustainable rate is the same as stabilizing unemployment around a long-run sustainable rate adjusted for the so-called participation gap, the gap between the actual labor force and a long-run sustainable path for the labor force.

[3]Laséen and Svensson (2011) show how forecasts for inflation and the real economy, conditional on alternative policy rate paths, can be constructed in forward-looking models in a consistent way. Svensson (2005) shows how judgment (information, knowledge, and news outside the scope of a particular model) can be incorporated in a consistent way.

Indeed, I would like to argue that this is fully consistent with Bayesian optimal policy, and that such Bayesian optimal policy is actually the most robust monetary policy one can conceive of.

In this context, a Bayesian optimal policy involves choosing a policy rate path (and 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, 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), including learning and Bayesian updating (signal extraction). I believe this is the most robust and practical policy among the alternatives. For instance, it means putting little weight on highly unlikely models, and putting the appropriate weight on extreme outcomes with small probabilities (Svensson 2003).

Handling non-additive uncertainty, such as multiplicative uncertainty and more general model uncertainty, is considered a most complex issue. However, I believe that in practice it is less of a problem. The practical issue is whether monetary policy should be more or less aggressive than implied by the mean forecasts of inflation and unemployment. This depends on the precise nature of the uncertainty in question. For instance, if the uncertainty is about the impact of the policy rate on the target variables, the standard Brainard (1967) result is that policy should be less aggressive. On the other hand, if the uncertainty is about the persistence of a target variable, such as inflation, Söderström (2002) shows that policy should be more aggressive. In practice, we normally do not have sufficient information about the nature of the uncertainty to judge whether policy should be more or less aggressive. Then it is best to stay with the standard mean forecast targeting.

However, there is one important exception to mean forecast targeting. The lower bound for the policy rate introduces an important non-linearity (the lower bound is probably not zero but somewhat negative; see Svensson 2010). If there is a risk of hitting the lower bound for the policy rate, we know that the optimal policy is more expansionary than indicated by the mean forecasts. Typically, the policy rate should be reduced to the lower bound sooner and

kept at the lower bound later than indicated by the mean forecasts (Eggertsson and Woodford 2003).

5. Why the Unemployment Gap Rather than the Output Gap?

In addition to the fact that the unemployment gap as a target variable follows rather directly from the Federal Reserve's and the Riksbank's mandates, it has several other advantages. Compared with other measures of resource utilization, unemployment has a stronger link to household welfare, is better understood and more familiar to the public, is measured often and with fewer errors, and is seldom revised. Estimates of the long-run sustainable unemployment rate can be examined, evaluated, and debated, while estimates of a long-run sustainable path for output are in practice more or less impossible to verify.[4]

The estimation of a sustainable path for output requires, in addition to an estimate of a sustainable path for employment, estimates of sustainable average working hours and a sustainable path for labor productivity. The latter requires assumptions about and estimates of sustainable paths for total factor productivity and for the capital stock. These assumptions and estimates introduce such large sources of error and such a large degree of arbitrariness in the estimation of a sustainable path for output that it in practice becomes less relevant for monetary policy. Estimating the long-run sustainable rate of unemployment is not easy, but it is much easier than estimating a long-run sustainable path for output.

There are also considerable conceptual problems with potential output and a long-run sustainable path for output. Is it trend output or flex-price output? Is it conditional on the existing capital stock or a long-run sustainable path for the capital stock? Most potential-output estimates become very model dependent. In contrast, the

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[4]Several years ago, when I was a big fan of the output gap as a target variable and was discussing with Alan Blinder which of the many concepts of potential output was most suitable, he strongly recommended the unemployment gap instead—on the grounds of simplicity and smaller measurement errors. I have obviously come around to his view.

**Figure 1. FOMC Summary of Economic Projections,
June 2010: Range and Central Tendency**
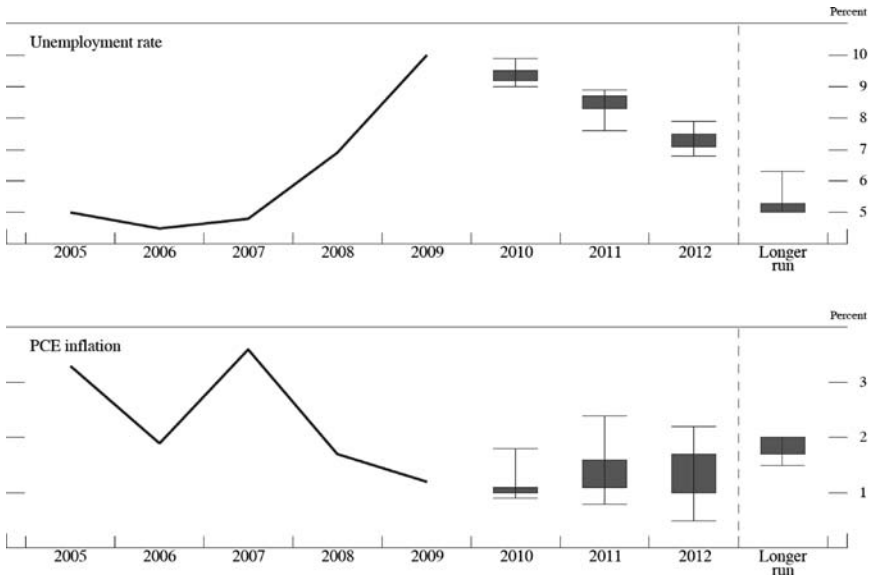
concept of a long-run sustainable rate of unemployment, the rational expectations steady-state rate (the natural rate), is much less problematic.[5]

6.   Examples of Practical Monetary Policy

Federal Reserve and Riksbank policy choices in the summer of 2010, discussed in Svensson (2011), provide interesting examples of practical monetary policy. Figure 1 shows FOMC forecasts of unemployment and inflation in the Summary of Economic Projections at the June 2010 meeting. The FOMC's forecast for inflation was below a mandate-consistent level, and its forecast for unemployment was

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[5]See Blanchard and Galí (2010) for a derivation of a quadratic loss function with the gap to the long-run sustainable rate of unemployment rather than a short-run NAIRU as an approximation to welfare. See Rogerson (1997) for why the natural rate of unemployment is ambiguously defined unless it is defined as the rational expectations steady-state rate.

Figure 2. Inflation and June/July 2010 Central Bank Forecasts, Sweden and United States

Percent
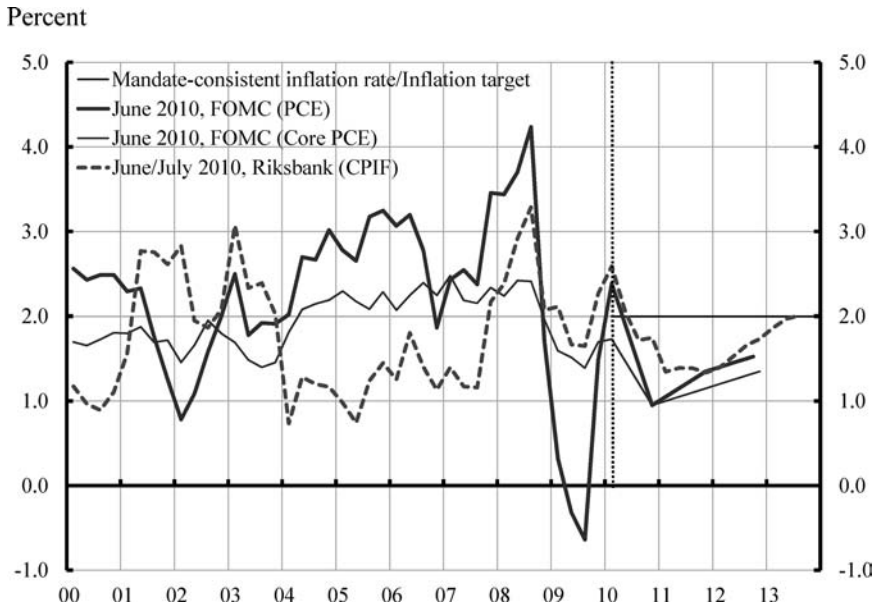
above a reasonable estimate of the sustainable rate. As shown in figures 2 and 3 (Svensson 2011, figures 1 and 2), the Riksbank's inflation forecast at its July 2010 meeting was also below the target, and the unemployment forecast was above the estimated sustainable rate.

The policy responses of the Federal Reserve and the Riksbank were, however, very different. The Federal Reserve maintained a minimum policy rate, soon started to communicate possible future easing, and in the fall launched QE2. In contrast, the Riksbank started a period of rapid tightening. While the Federal Reserve's expansionary monetary policy was called for, the tight policy of the Riksbank was, in my view, inappropriate. Svensson (2011) provides more discussion and detail.

When it comes to choosing the most appropriate policy response in practice, it should not be the case that a lower or higher policy rate path leads to better target fulfillment for both inflation and unemployment. It is possible to assess these things with the aid of

Figure 3. Unemployment and June/July 2010 Central Bank Forecasts, Sweden and United States

Percent
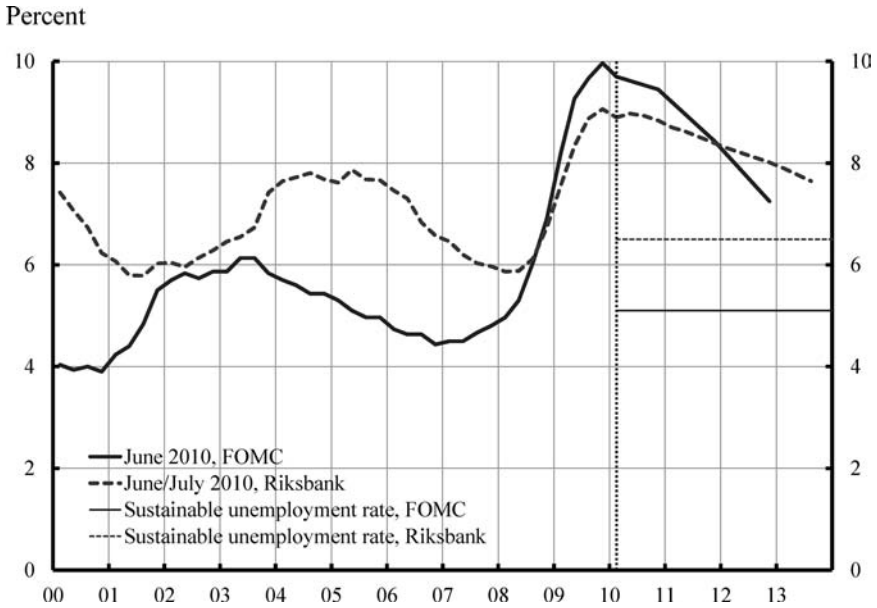
the four-panel figures that I bring to the Riksbank's policy meetings and that are published in the Riksbank's minutes. Figure 4 shows the four-panel figure from the Riksbank's meeting in February 2012, with a higher and a lower policy rate path than the majority's choice (the "main scenario") and corresponding forecasts for CPIF inflation and unemployment.[6] At the meeting in February 2012, the forecast for inflation in terms of the CPIF was below the inflation target, and the forecast for unemployment was above the estimated sustainable rate. A lower policy rate path would have implied a better target fulfillment. In addition, as shown in figure 5, assuming a forecast for foreign policy rates in accordance with implied forward rates and the

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[6]In recent years, large changes in the Riksbank's policy rates have led to large differences between inflation measured with the CPI price index, which includes the effect of changes in mortgage rates on housing costs, and inflation measured with the CPIF price index, which does not. Most Executive Board members therefore consider stabilizing CPIF inflation to be more relevant under current circumstances, and the Riksbank has communicated this.

Figure 4. Riksbank Monetary Policy Alternatives, February 2012: Foreign Policy Rates according to Riksbank Forecast (sustainable unemployment rate 6.5 percent)
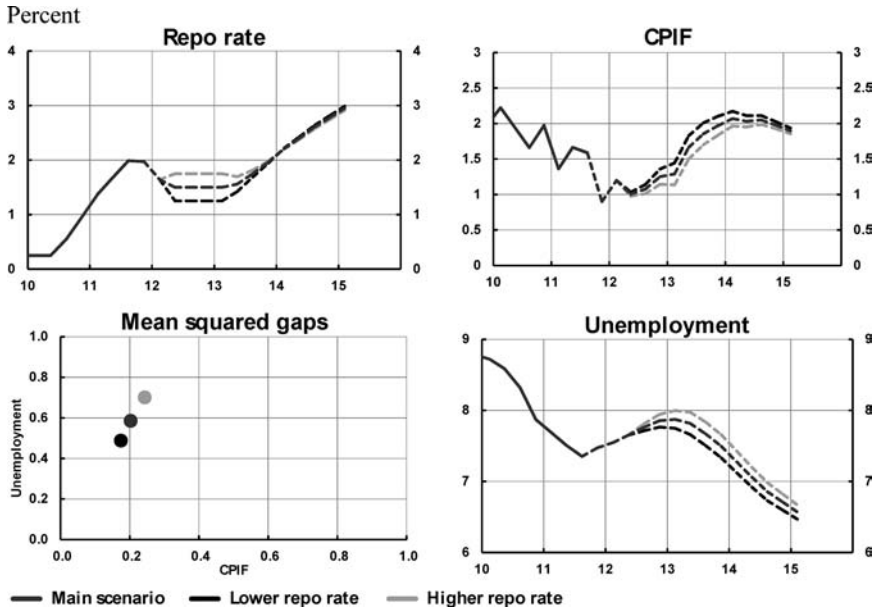

arguably more reasonable assessment of a sustainable unemployment rate of 5.5 percent (Svensson 2012a), an even lower repo rate path was called for, which I dissented in favor of. See Sveriges Riksbank (2012) for more details.

7.   Summary

Athanasios's and Volker's new paper presents a very valuable study of the performance of simple instrument rules in a number of different models of the euro area. However, I do not believe that their approach of evaluating and choosing a simple policy rule, as well as their emphasis on the complexity of monetary policy, is the best guide to practical monetary policy. As I see it, the principles of good monetary policy are actually very simple. For the Federal Reserve and the Riksbank, their mandates of price stability and maximum

**Figure 5. Riksbank Monetary Policy Alternatives,
February 2012: Foreign Policy Rates according to Forward
Rates (sustainable unemployment rate 5.5 percent)**
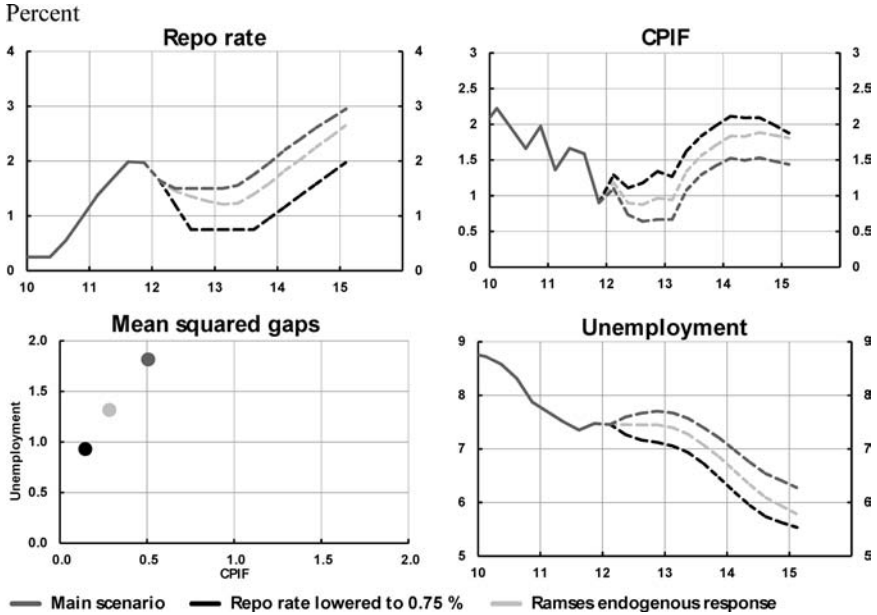
sustainable employment boil down to choosing a policy rate path such that the resulting forecasts for inflation and unemployment best stabilize inflation and unemployment around the inflation target and an estimated long-run sustainable rate, respectively. However, whereas the principles are simple, of course the application of these principles (the construction of forecasts for inflation and unemployment conditional on different policy rate paths) can be very complex.

References

Bernanke, B. 2007. "Federal Reserve Communications." Speech at the Cato Institute 25th Annual Monetary Conference, Washington, DC, November 14.

Blanchard, O., and J. Galí. 2010. "Labor Markets and Monetary Policy: A New Keynesian Model with Unemployment." *American Economic Journal: Macroeconomics* 2 (2): 1–30.

Brainard, W. C. 1967. "Uncertainty and the Effectiveness of Policy." *American Economic Review Papers and Proceedings* 57 (2): 411–25.

Eggertsson, G. B., and M. Woodford. 2003. "The Zero Bound on Interest Rates and Optimal Monetary Policy." *Brookings Papers on Economic Activity* (2003:1): 139–211.

Giannoni, M. P., and M. Woodford. 2005. "Optimal Inflation-Targeting Rules." In *The Inflation-Targeting Debate*, ed. B. S. Bernanke and M. Woodford, 93–172 (chapter 3). Chicago: University of Chicago Press.

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

Qvigstad, J. 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.

Rogerson, R. 1997. "Theory Ahead of Language in the Economics of Unemployment." *Journal of Economic Perspectives* 11 (1): 73–92.

Söderström, U. 2002. "Monetary Policy with Uncertain Parameters." *Scandinavian Journal of Economics* 104 (1): 125–45.

Svensson, L. E. O. 2003. "Optimal Policy with Low-Probability Extreme Events." In *Macroeconomics, Monetary Policy, and Financial Stability — A Festschrift for Charles Freedman*, 79–104. Proceedings of a conference held by the Bank of Canada, Ottawa, June.

———. 2005. "Monetary Policy with Judgment: Forecast Targeting." *International Journal of Central Banking* 1 (1): 1–54.

———. 2010. "Monetary Policy and Financial Markets at the Effective Lower Bound." *Journal of Money, Credit and Banking* 42 (s1): 229–42.

———. 2011. "Practical Monetary Policy, Examples from Sweden and the United States." *Brookings Papers on Economic Activity* (Fall): 289–332.

———. 2012a. "Correcting the Riksbank's Estimate of the Long-Run Sustainable Rate of Unemployment." Comment. Available at http://www.larseosvensson.net.

———. 2012b. "Differing Views of Monetary Policy." Speech at SNS, Stockholm, June 8.

Svensson, L. E. O., and M. Woodford. 2003. "Indicator Variables for Optimal Policy." *Journal of Monetary Economics* 50 (3): 691–720.

———. 2005. "Implementing Optimal Policy through Inflation-Forecast Targeting." In *The Inflation-Targeting Debate*, ed. B. S. Bernanke and M. Woodford, 19–83. Chicago: University of Chicago Press.

Sveriges Riksbank. 2012. "Minutes of the Executive Board's Monetary Policy Meeting." February 12.

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