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Practical Monetary Policy: Examples from Sweden and the United States

ABSTRACT In the summer of 2010, the Federal Reserve's and the Swedish Riksbank's inflation forecasts were below the former's mandate-consistent rate and the latter's target, respectively, and their unemployment forecasts were above sustainable rates. Conditions in both countries clearly called for policy easing. 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. I find the arguments against the Federal Reserve's easing and the arguments for the Riksbank's tightening unconvincing. Although the Swedish economy subsequently performed better than expected, probably an important reason was that the market implemented much easier financial conditions than were consistent with the Riksbank's policy rate path. Without the policy tightening, performance would have been even better. The U.S. economy meanwhile performed worse than expected because of factors other than monetary policy. Without the policy easing, performance would have been even worse. In short, the Riksbank did the wrong thing but was lucky, whereas the Federal Reserve did the right thing but was unlucky.

In the spring of 2011, the Swedish economy was being called a “Pippi Longstocking economy” and a “tiger economy,” reflecting high growth after a deep recession.¹ Conditions in the U.S. economy seemed more problematic. One might think that Sweden's good performance reflected,

1. The reference to Pippi Longstocking (a fictional character, known for her unusual strength, in children's books by the Swedish author Astrid Lindgren) was made by OECD Secretary-General Angel Gurría in a speech on January 20, 2011. References to a tiger economy were, according to media reports, made by the British Chancellor of the Exchequer George Osborne and Swedish Minister of Finance Anders Borg.

among other things, good monetary policy, and that the U.S. situation reflected, among other things, less good monetary policy. I will argue that on the contrary, and perhaps surprisingly, in the summer of 2010 when forecasts for inflation (too low) and unemployment (too high) were similar in the two countries, the Riksbank's monetary policy, by starting a period of rapid policy rate increases, was not appropriate. In contrast, the Federal Reserve kept the policy rate at its lower bound, soon started to communicate possible policy easing, and later launched QE2, the second round of quantitative easing. That the Swedish economy nevertheless grew faster than expected may largely be explained by the market implementing an actual yield curve that was lower than implied by the policy rate path, so that actual financial conditions were much more expansionary than the Riksbank intended. That the U.S. economy performed worse than expected is due to factors other than monetary policy.

This paper examines the actions of the Federal Reserve and the Riksbank in the summer of 2010 as examples of practical monetary policy. My starting point is that the objective of a good monetary policy framework is twofold: to stabilize inflation around a low level and to stabilize resource utilization around the highest sustainable level. The dual mandate of maximum employment and stable prices of the Federal Reserve, with its mandate-consistent inflation rate, and the flexible inflation targeting of the Riksbank are both fully consistent with such a framework. There is no fundamental difference between the monetary policy frameworks of the two central banks, although their communications strategies are somewhat different.²

The Federal Reserve's dual mandate and the Riksbank's flexible inflation targeting both boil down to "forecast targeting" (Woodford 2007, Svensson 2011b), that is, choosing a policy rate path such that the corresponding forecasts for inflation and resource utilization "look good," in the sense that they best stabilize inflation around the inflation objective (the mandate-consistent rate or the target inflation rate) and resource utilization around its highest sustainable level. Thus, "looking good" means

2. For instance, until January 2012 the Federal Reserve's mandate-consistent inflation rate had to be inferred from the Federal Open Market Committee participants' longer-term inflation forecasts, whereas the Riksbank has an explicit inflation target; the Federal Reserve's Greenbook and Bluebook (now replaced by the Tealbook) are published with a 5-year lag, whereas the Riksbank publishes an extensive *Monetary Policy Report* or a shorter *Monetary Policy Update* (both of which also include a policy rate path) after each policy meeting; and the Federal Reserve's minutes are nonattributed, but attributed transcripts are published with a 5-year lag, whereas the Riksbank's minutes are attributed. In January 2012 the Federal Reserve announced an inflation goal of 2 percent and released policy path charts.

achieving an efficient trade-off between inflation stability and stable resource utilization.³

The forecasts for inflation and unemployment published by the Federal Open Market Committee (FOMC) and the Riksbank make it possible to assess whether they “look good”—more precisely, whether they look as good as possible, taking into account what policy actions are possible. What is possible depends in turn on restrictions such as the zero lower bound (ZLB) on interest rates, the ability to manage expectations of future policy rates and inflation, and the availability of unconventional policy tools such as the size and composition of the central bank’s balance sheet.

In the summer of 2010, forecast inflation in both countries was too low relative to the central bank’s objective, and forecast unemployment was too high relative to a sustainable unemployment rate. All else equal, such a configuration of forecasts calls for more expansionary policy, if that is possible. In the event, as mentioned, the FOMC and the Riksbank chose very different policies. The FOMC maintained a target range for the federal funds rate of 0 to 25 basis points (bp) and effectively eased policy further by communicating possible future policy easing and, in the fall, launching QE2. The Riksbank instead embarked on a policy of rapid policy rate increases.

Several arguments against the Federal Reserve’s policy easing have been presented. These relate to concerns about higher inflation and the anchoring of inflation expectations, to uncertainty about the effect of the unconventional policy measures, to possible negative consequences of low policy rates for financial stability and investment allocation, to possible overestimation of the amount of slack in the economy, and to concerns about increased exposure of the Federal Reserve’s balance sheet to possible capital losses. Some emerging-market policymakers have also expressed concern that the policy would result in increased capital inflows into their countries, generating bubbles and other negative impacts. I will argue that none of these arguments are convincing, and thus that the Federal Reserve’s policy easing was appropriate.

Several arguments for the Riksbank’s policy tightening have likewise been presented. One argument focuses on the stabilization of economic growth rather than of resource utilization, another seems to call for mechanical revision of the policy rate path as outcomes diverge from forecasts, a third advocates using the policy rate to limit increases in household debt

3. Kohn forthcoming, Svensson (2011b), and Woodford (2007) explain why forecast targeting is both a better way of conducting policy and a better description of actual policy than following an instrument rule such as the Taylor rule.

and housing prices, and a fourth calls for normalizing the policy rate to prevent unspecified future financial imbalances. I will argue that these arguments, too, are not convincing, and thus that the Riksbank's policy tightening was a mistake.

I will argue further that the Riksbank's action was a mistake not only *ex ante*, taking into account only the information available at the time, but also *ex post*, taking into account information that became available later. As I have argued elsewhere (Svensson forthcoming), evaluation *ex ante* is more relevant when assessing the quality of policy decisions, whereas evaluation *ex post*, although still interesting, largely means assessing whether the policymaker was lucky or unlucky. By July 2011, a year after the tightening began, the Swedish economy had performed better than had been anticipated. Growth had been higher and unemployment had fallen more than forecast in the summer of 2010. Does this better-than-expected performance mean that the policy tightening begun in the summer of 2010 was right? Put differently, had the better future performance of the Swedish economy been known at the time, would it have been right to initiate policy tightening? My answer is no. The reason is that in July 2011, inflation and the inflation forecast, although higher, were still too low, and unemployment and the unemployment forecast, although lower, were still too high. A more expansionary policy in the summer of 2010 would have resulted in an even better outcome, with inflation higher and unemployment lower.

Why did the Swedish economy perform better than had been anticipated in the summer of 2010? The Riksbank itself (Sveriges Riksbank 2011c) mentions higher-than-expected exports, domestic demand, and productivity. But another possible explanation, not mentioned in that document, is that *actual* financial conditions were substantially more expansionary than the *intended* financial conditions. That is, the actual market term structure of interest rates was more expansionary than that which would have been consistent with a credible policy rate path and normal term premiums. For instance, from the beginning of 2010 until July 2011, Swedish 5-year interest rates were on average about 85 bp lower than the average consistent with a credible policy rate path and normal term premiums. Thus, the Swedish economy may have benefited from the market effectively implementing a more expansionary policy than what the Riksbank intended.

Three circumstances may have contributed to the Riksbank's choice of a high policy rate path. First, its forecast for foreign policy rates has consistently been too high, much above levels consistent with foreign yield curves and implied forward rates. All else equal, this implies an upward

bias in the domestic policy rate path. Second, the outlook for potential output and estimates of past potential output were seen as having shifted downward considerably since the global financial crisis, even though the shock to the economy was an aggregate demand shock, in the form of a collapse of world demand for Swedish exports, and thus should have had little or no effect on future, let alone past, potential output. All else equal, this downward shift of the potential output forecast implies an upward bias in the estimate of resource utilization and thus in the policy rate path. Third, Sweden has undertaken substantial structural reforms over the last few years, which, studies indicate, have significantly lowered the sustainable unemployment rate. Yet the Riksbank in response has made only a small adjustment to its estimate of the sustainable rate, thus imparting another upward bias to the policy rate path. A lower forecast for foreign policy rates in line with market expectations, together with a higher estimated potential output and a lower estimated sustainable unemployment rate, would strengthen the case for more expansionary policy in Sweden.

The paper is organized as follows. Section I discusses the monetary policy framework in the United States and Sweden, section II shows how published FOMC and Riksbank forecasts can be used to analyze policy, and section III discusses the situation and policy decisions at the FOMC's and the Riksbank's meetings in the summer of 2010. Section IV scrutinizes arguments for the Riksbank's policy tightening, and section V scrutinizes arguments against the FOMC's policy easing. Section VI discusses the situation facing the Riksbank in July 2011, why the Riksbank's policy rate path was so high, and why the Swedish economy performed better than expected.⁴ Section VII presents some broader conclusions. Online appendixes contain further details.⁵

I. The Monetary Policy Framework

A good monetary policy framework has as its objective both price stability and real stability; more precisely, the objective is to stabilize both inflation around a low rate and resource utilization around the highest sustainable level. The mandates of the Federal Reserve and the Riksbank are both

4. Being a central banker, in line with central bank custom I will refrain from commenting on the current and prospective policies of other central banks and therefore refrain from commenting on Federal Reserve policy in the summer of 2011 and later.

5. Online appendixes for papers in this volume may be accessed on the *Brookings Papers* webpage at www.brookings.edu/economics/bpea.aspx. Those for this paper may also be found at the author's website, www.larseosvensson.net.

consistent with this. The Federal Reserve's dual objective of maximum employment and stable prices can be seen as stabilizing inflation around a mandate-consistent inflation rate and stabilizing employment around the highest sustainable employment rate.⁶ "Maximum employment" is in practice the same as the highest sustainable employment rate. The Riksbank's objective is likewise twofold: to stabilize inflation around the inflation target and resource utilization around the highest sustainable level.⁷

In practice, the dual mandate and flexible inflation targeting both amount to "forecast targeting" (Woodford 2007, Svensson 2011b): choosing a policy rate and a policy rate path (or, under special circumstances, using unconventional policy instruments) that best stabilize both the resulting inflation forecast around the objective and the resulting resource utilization forecast around a sustainable level. This can be made more precise by specifying a measure of inflation (PCE or core PCE inflation in the U.S. case, CPIF inflation in Sweden; both are defined below) and a measure of resource utilization (such as the gap between the unemployment rate and an estimate of the sustainable rate), and by specifying a quantitative measure of stability, that is, a measure of to what extent a particular forecast of inflation or resource utilization stabilizes inflation or resource utilization.

A suitable measure of stability is the mean squared gap: the mean over the forecast period of the squared deviation of the mean forecast from the target or sustainable level (the sum of squared deviations can be used

6. In response to a question about an explicit inflation target for the Federal Reserve at the press conference on June 22, 2011, Chairman Ben Bernanke explained why an inflation target is consistent with the Federal Reserve's mandate (Bernanke 2011c, pp. 9–10).

7. As expressed in Sveriges Riksbank (2010d, p. 5), "The Riksbank, in addition to stabilising inflation around the inflation target, [is] also striving to stabilise production and employment around long-term sustainable paths." The next sentence says, "This does not mean that the Riksbank neglects the fact that the inflation target is the overriding objective," in line with the Riksbank's "hierarchical" mandate (consistent with the statutes of the European System of Central Banks) that makes price stability the primary objective of monetary policy. As discussed in Svensson (2004), however, there is no fundamental difference between the Riksbank's hierarchical and the Federal Reserve's dual mandate, once we distinguish first and second moments, that is, means and variances. The hierarchical mandate applies to the first moment, the unconditional mean. When it comes to the first moment, there is an explicit inflation target (an inflation rate of 2 percent per year) that is chosen and enforced by the Riksbank. No explicit target is chosen for resource utilization. Instead, the highest sustainable resource utilization is determined by the properties of the economy and structural policies and is estimated by the Riksbank. Thus, the Riksbank has an independently chosen target for inflation but no independently chosen target for resource utilization. For the second moments, the variability of inflation and resource utilization, the Riksbank has a dual mandate in that it aims to stabilize both inflation around the chosen target and resource utilization around the estimated highest sustainable level.

instead).⁸ Specifying weights on the stability of resource utilization and on the stability of inflation then results in a standard quadratic loss function (with no discounting). One can go further and discuss 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. In practice there is usually insufficient information to know whether a policy should be more or less aggressive than the certainty-equivalent one, so the certainty-equivalent policy is still warranted (the main exception is the nonlinearity caused by the lower bound on nominal interest rates).

I have come to the conclusion that the gap between the unemployment rate and an estimate of the sustainable rate is the best measure of resource utilization. The main reason is that the alternative of using the output gap requires estimating potential output, and during my period at the Riksbank I have become more skeptical about measures of potential output. Estimating the sustainable unemployment rate is less difficult and carries less risk of big mistakes. One can thus have a more open and transparent discussion about the sustainable unemployment rate than about potential output. I discuss some problems relating to the Riksbank's measures of potential output in section VI.

Also important is to distinguish between using measures of resource utilization as indicators of inflationary pressures and using them as target variables. For the former, it is the gap between the unemployment rate and any short-run NAIRU or equilibrium unemployment rate that is relevant. For use as a target variable, however, I am convinced that the relevant measure is the gap between the actual unemployment rate and the sustainable rate. Using instead a short-run NAIRU as a target and stabilizing unemployment around it effectively implies introducing inflation smoothing as an objective, which makes little sense. (This issue is discussed further in online appendix A1.) This is not to say that short-run slack in the economy should be disregarded. Short-run slack does have an impact on inflation and the inflation forecast, but it is only for that analysis that it matters.

8. If the forecast is not close to its target or sustainable level at the end of the forecast period, the horizon of the mean squared gap can be extended, using any information about the forecast beyond the forecast horizon or by assuming a gradual return to the target or sustainable level. For details on mean squared gaps, see Svensson (2011b).

II. Using FOMC and Riksbank Forecasts to Analyze Policy

Published Riksbank forecasts for inflation, various resource utilization measures, and the policy rate make it easy to describe the economic outlook in Sweden and to assess whether easier or tighter policy would better stabilize inflation and resource utilization or make them worse. The published FOMC participants' projections for inflation, GDP growth, and unemployment create considerable scope to do the same for the United States. Indeed, at Chairman Ben Bernanke's press conferences after the policy meetings, these projections take center stage. As he noted in his opening remarks at the press conference on April 27, 2011:

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 2011b, pp. 4–5)

The FOMC's projections are usually presented in terms of an interval, called the central tendency, where the three highest and the three lowest projections for each year have been excluded. However, the individual participants' projections are presented in sufficient detail that a smaller interval for the median of the projections can be identified. The midpoint of that interval can then be used as a reasonable point forecast of the FOMC. Further, the median of the different participants' longer-run projections for inflation can, by the median-voter theorem, be interpreted as the result of a hypothetical majority vote among them about the FOMC's mandate-consistent inflation rate, and the median of the longer-run projections for unemployment as the result of such a vote about the FOMC's estimate of the sustainable unemployment rate.⁹

The forecasts used to guide monetary policy should be *mean* forecasts, not mode or median forecasts. Mean forecasts have the attractive property

9. The "participants" at FOMC meetings are all the members of the Board of Governors and all the Federal Reserve Bank presidents. The "members" are the voting participants only. One might argue that the relevant forecasts are those of the voters only, but their separate forecasts are not available. The majority projections for growth, inflation, and unemployment need not always be consistent with the majority projection for monetary policy; see Claussen and Røisland (2010). Here I abstract from such "discursive dilemmas."

that they are “risk adjusted,” in the sense of being the probability-weighted sum of upside and downside risks; that is, the risks should already be incorporated into the mean forecast and need not be accounted for separately. For instance, a higher probability of a low outcome will reduce the mean outcome. The Riksbank forecasts are, since February 2007, intended to be mean forecasts, but the FOMC forecasts are mode forecasts. However, I will assume that the probability distributions around FOMC forecasts are sufficiently close to unimodal and symmetric that the difference between the mode and the mean does not matter. (Online appendix A2 discusses mean, mode, and median forecasts in more detail.)

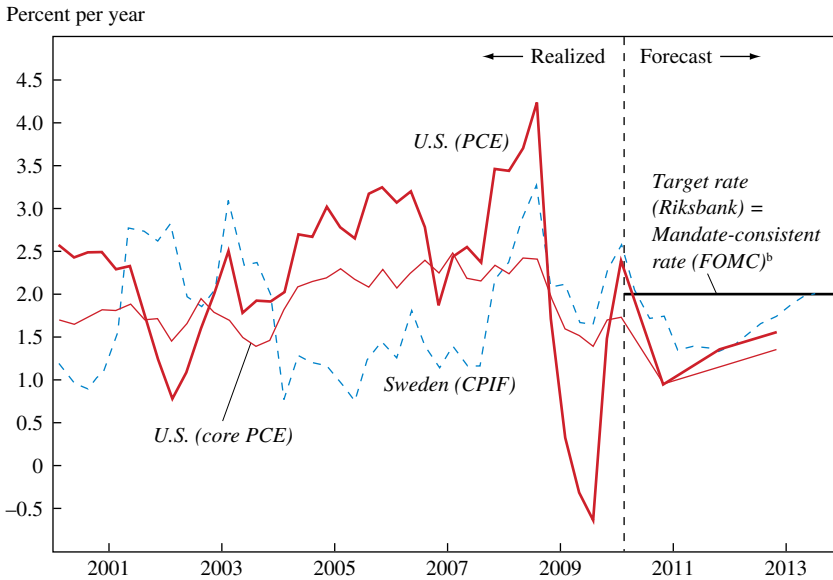
Each FOMC participant’s projections of inflation, unemployment, and growth are based on that participant’s assessment of “appropriate monetary policy,” defined as “the future path of policy that each participant deems most likely to foster outcomes for economic activity and inflation that best satisfy his or her interpretation of the Federal Reserve’s dual objectives” (FOMC 2010b). Thus, behind each participant’s projection is a policy rate projection. Those projections are not published, however. That is, the *intended* monetary policy and financial conditions are not directly available. Instead, only the *actual* financial conditions, in the form of the market term structure of interest rates, are available. In contrast, for the Riksbank both intended and actual financial conditions are directly available.

As examples of practical monetary policy, I will look at the policy decisions by the two central banks in the summer of 2010: that of the FOMC at its June 22–23 meeting, announced on June 23, and that of the Riksbank at its June 30 meeting, announced on July 1 (which I therefore call the June/July meeting). For the Riksbank I will also look at the policy decision a year later, on July 4, 2011, announced on July 5.

III. The Situation in June 2010

Figure 1 shows, for the United States, realized PCE inflation and realized core PCE inflation from 2000 through 2010Q1, the last full quarter for which data were available for the FOMC June 2010 policy meeting. (PCE inflation is the annual rate of change in the price index for personal consumption expenditures; core PCE inflation uses the PCE price index excluding food and energy.) The extensions of those series beyond 2010Q1 represent the FOMC forecasts for the two measures at that meeting, constructed as the median of the participants’ projections as reported in FOMC (2010b). For Sweden, figure 1 shows realized and forecast CPIF inflation (the

Figure 1. Inflation, Realized and June/July 2010 Central Bank Forecasts, Sweden and United States^a



Sources: Bureau of Economic Analysis, FOMC, Sveriges Riksbank, and Statistics Sweden.

a. The vertical line indicates 2010Q1, the last quarter for which inflation outcomes were available for the FOMC's and the Riksbank Executive Board's June/July 2010 meetings. The extensions to the right of the vertical line are the forecasts announced after those meetings.

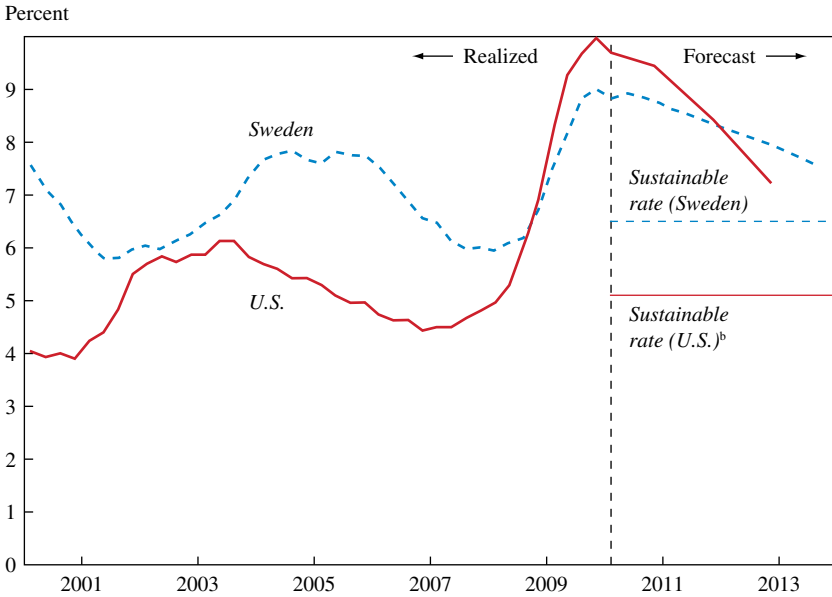
b. Median of FOMC participants' longer-run projections of PCE inflation as of the June 2010 meeting, rounded from 1.95 percent. The Riksbank's inflation target is also 2 percent.

annual change in the consumer price index excluding direct effects on the CPI of changes in mortgage rates) from the Riksbank's June/July 2010 meeting.¹⁰

The central tendency of the FOMC participants' longer-run PCE projections is reported as 1.7 to 2.0 percent, but the median actually falls in the upper range of this interval, or more precisely, between 1.85 and 2.05 percent, with the midpoint at 1.95 percent (FOMC 2010b). I will assume here that this number, rounded (using unbiased rounding) to 2 percent, is the Federal Reserve's mandate-consistent inflation rate. The Riksbank's inflation target

10. In recent years, large changes in the Riksbank's policy rates have led to large differences between the CPI, which includes the effect of varying mortgage rates on housing costs, and the CPIF, 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 2. Unemployment Rate, Realized and June/July 2010 Central Bank Forecasts, Sweden and United States^a



Sources: Bureau of Labor Statistics, FOMC, Sveriges Riksbank, and Statistics Sweden.

a. The vertical line indicates 2010Q1, the last quarter for which unemployment rate outcomes were available for the FOMC's and the Riksbank Executive Board's June/July 2010 meetings. The extensions to the right of the vertical line are the forecasts announced after those meetings.

b. Median of FOMC participants' projections of the longer-run unemployment rate, as of the June 2010 meeting, rounded from 5.05 percent.

is also 2 percent. As the figure shows, both central banks were forecasting inflation below the objective, except at the end of the forecast period for the Riksbank. These forecasts alone indicate that more expansionary policy, if possible, was appropriate.¹¹

Figure 2 shows the two countries' realized and forecast unemployment rates at the same policy meetings. Also shown is the median of the FOMC participants' projections of the longer-run unemployment rate, which I take as the FOMC's estimate of the sustainable unemployment rate. The median falls in the interval from 4.95 to 5.15 percent, with the midpoint at

11. Appropriately calibrated, more expansionary policy could have shifted the early part of the Riksbank forecast up toward the target without overshooting at the end of the forecast period. Even if there were some overshooting at the end of the forecast period and beyond, this would affect the mean squared gap very little, since the forecast would still be close to the target.

5.05 percent, which I round to 5.1 percent.¹² For Sweden, a graph in the Riksbank's October 2010 *Monetary Policy Report* (figure B23, p. 61) shows an estimate of the sustainable unemployment rate of 6.5 percent from 2010 onward. I therefore use that as the sustainable unemployment rate as of the June/July meeting. Both the U.S. and the Swedish forecasts are above the sustainable rate, meaning that forecast resource utilization was too low, thus also indicating that more expansionary policy, if possible, was appropriate.

In such a situation, the simple criterion suggested by Deputy Governor of the Norges Bank Jan Qvigstad (2005) applies: the forecasts for inflation and resource utilization should not both be too low, nor should both be too high. If both are too low, as in this case, easier policy would better stabilize both inflation and resource utilization.

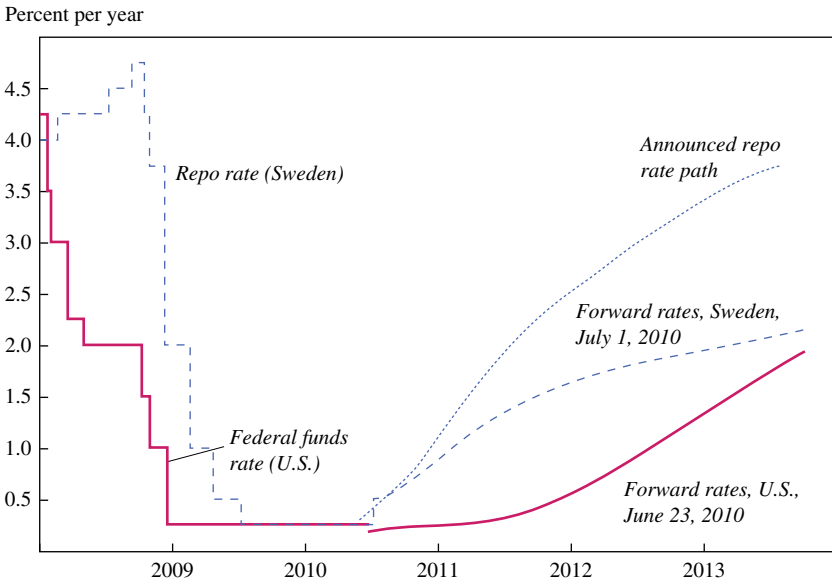
The FOMC (2010a) announced after its June meeting that it "will maintain the target range for the federal funds rate at 0 to ¼ percent and continues to anticipate that economic conditions, including low rates of resource utilization, subdued inflation trends, and stable inflation expectations, are likely to warrant exceptionally low levels of the federal funds rate for an extended period." In August it announced that it would keep the Federal Reserve's holdings of securities constant at their current level by reinvesting principal payments from agency debt and agency mortgage-backed securities in longer-term Treasury securities. After speeches by Chairman Bernanke (2010a, 2010b) in August and September in which he discussed additional policy measures, in November the FOMC launched QE2, announcing that it intended to purchase a further \$600 billion of longer-term Treasury securities by the end of 2011Q2.

The Riksbank, in contrast, raised its policy rate, the repo rate, from 25 bp to 50 bp after its June/July meeting, launching a period of rapidly rising policy rates. In doing so it announced that "the Swedish economy is developing strongly following the severe downturn. The repo rate now needs to be raised gradually towards more normal levels to attain the inflation target of 2 per cent and to ensure stable growth in the real economy." Two members of the Riksbank's Executive Board, Deputy Governor Karolina Ekholm and I, dissented.¹³

12. This would be rounded to 5.0 using unbiased rounding, but all projections outside this interval are above the interval. Therefore, I depart here from unbiased rounding and round up to 5.1 percent.

13. Ekholm's dissent cited "the increased uncertainty prevailing as regards the sovereign debt problems in the euro area . . . [and] the relatively low inflationary pressure." In my dissent I "advocated a repo-rate path with a repo rate of 0.25 per cent through the fourth quarter of 2010, and thereafter a gradual return to the repo-rate path of the main scenario" on the grounds that "such a repo-rate path results in a better outcome for both resource utilisation and inflation, with both lower unemployment and CPIF inflation closer to the target."

Figure 3. Policy Rates, Policy Rate Expectations, and Riksbank Policy Rate Path, June/July 2010, Sweden and United States^a



Sources: Reuters EcoWin and Sveriges Riksbank.

a. Forward rates are adjusted for normal forward term premiums (assumed to be 1 bp per month).

Figure 3 shows the federal funds rate before and the term structure of U.S. interest rates after the FOMC's June 23 announcement; the term structure here is measured by market forward rates adjusted for normal forward term premiums (assumed to be 1 bp per month). The forward rate curve indicates that the market expected the federal funds rate to remain at its very low level at least for another year. For Sweden the figure shows the repo rate before and the term structure of interest rates (likewise measured by adjusted forward rates) after the Riksbank's July 1 announcement. The figure also shows the announced policy rate path. Note that the forward rate curve is much lower than the policy rate path, indicating that the market expected the Riksbank to raise the policy rate at a much slower pace.

Thus, for Sweden, figure 3 shows both the actual financial conditions (market expectations of the future repo rate) and the Riksbank's intended financial conditions (the published repo rate path). For the FOMC, the figure shows only the actual financial conditions (market expectations of the future federal funds rate). We do not know what policy rate path corresponds to the median of the FOMC participants' views of "appropriate policy."

Nor do we know whether appropriate policy for some participants included at least some of the QE that the Federal Reserve implemented in the fall.

Figure 3 highlights that, for the Riksbank, more expansionary policy was clearly possible. Obviously, the published policy rate path could have been shifted down. This should have had an impact on market expectations and shifted down the term structure of interest rates, in particular if the policy rate path were shifted down to or below the forward rate curve. The FOMC, however, was clearly more constrained. The target range for the federal funds rate was 0 to 25 bp, and the zero lower bound (ZLB) was effectively binding. Arguably, the funds rate could have been lowered to zero, and a zero interest rate could have been paid on reserves (Bernanke 2010a, 2011a). The FOMC could also have announced that it might keep the federal funds rate low for longer than the market was expecting, and possibly shifted the term structure of interest rates down further (Bernanke 2010a, 2010b, Yellen 2011c). Indeed, just over a year later, in its August 9, 2011, statement, the FOMC extended the period of low federal funds rates, announcing that it anticipated that economic conditions were likely to warrant “exceptionally low levels for the federal funds rate at least through mid-2013.” However, we do not know how successful such a move would have been in June 2010. Finally, the FOMC could have managed its balance sheet so as to reduce longer-term interest rates, by reducing term premiums. Some simulations published later (Chung and others 2011, Fuhrer and Olivei 2011) indicate that such action would have had a significant effect, and in the end, this is what the FOMC opted for in the fall. As was apparent from the reaction of some politicians and the media, the FOMC then faced substantial political resistance to more expansionary policy. I find it difficult to judge the overall extent of economic and political constraints on the FOMC.¹⁴

IV. Arguments for the Riksbank’s Policy Tightening

The argument *against* the Riksbank’s policy tightening in June/July 2010 is straightforward. Forecast inflation was too low, and forecast unemployment was too high. Easier policy would have led to better attainment of

14. In September 2011 the FOMC introduced a new Operation Twist, in which purchases of longer-maturity bonds are financed not by increased reserves but by sales of shorter-maturity Treasury bills and bonds, keeping the overall balance sheet constant. See Swanson (2011) on the original Operation Twist.

both inflation and resource utilization objectives. Several arguments *for* the Riksbank's policy tightening are presented in the minutes of that meeting (Sveriges Riksbank 2010b) and were presented at other policy meetings.

I group them here into four main arguments:

- the growth stabilization argument
- the revision argument
- the household debt and housing prices argument
- the normalization argument.

Except for the second, all four are essentially arguments for why policy should, at least on this occasion, be based on something other than the forecasts of inflation and resource utilization.

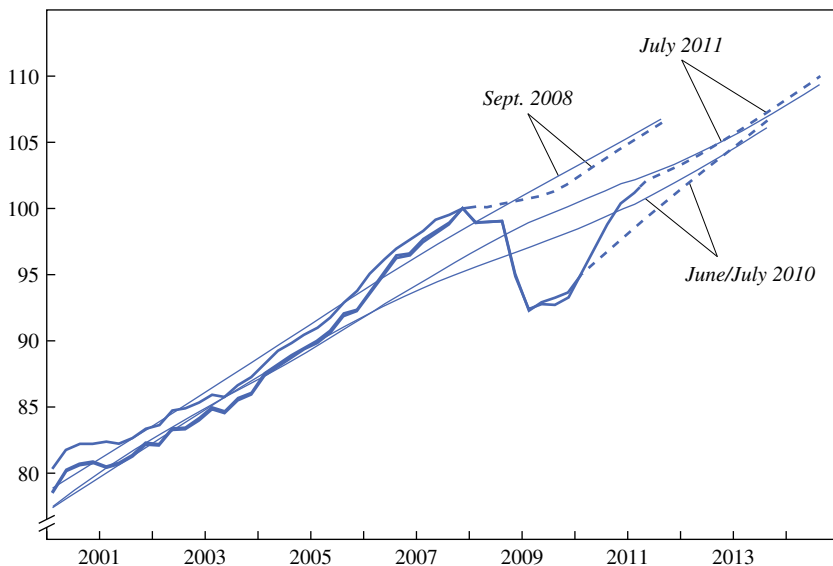
IV.A. The Growth Stabilization Argument

Some arguments for tightening seem to concern the stabilization of economic growth rather than of resource utilization. Recall that the Riksbank's July 2010 announcement stated that "the Swedish economy is developing strongly following the severe downturn. The repo rate now needs to be raised gradually towards more normal levels to attain the inflation target of 2 per cent and to ensure *stable growth* in the real economy" (emphasis added). This gives the impression that monetary policy was directed toward stabilizing growth rather than the level of resource utilization. However, the Swedish word translated here as "growth" is *utveckling*, which is often translated as "development" or, in this context, as "performance." Therefore, the sentence above should arguably have ended "to ensure the stable *performance* of the real economy." Still, it is clear that the announcement emphasizes the change in the real economy rather than the level of resource utilization. And, as far as I know, no objections were raised to translating *utveckling* as "growth."

Furthermore, the headings in the slide presentation at the press conference on July 1, 2010, read as follows: "Swedish economy developing strongly," ". . . despite fiscal problems in Europe," "Limited impact on the financial markets," "The global recovery is continuing," "Broad upturn in Swedish economy," "The upturn is continuing," "Employment is increasing," "Lower unemployment ahead," "Inflation in line with target," "Interest rate increased from low level," "A forecast, not a promise," and again, as clearly the main message, "Swedish economy developing strongly." It seems fair to say that these headings reinforce the impression that the Riksbank was emphasizing the growth in the economy and the change in resource utilization rather than the level of resource utilization.

Figure 4. GDP, Realized and Forecast, and Potential GDP, Sweden^a

Index, 2007Q4 GDP = 100



Sources: Sveriges Riksbank and Statistics Sweden.

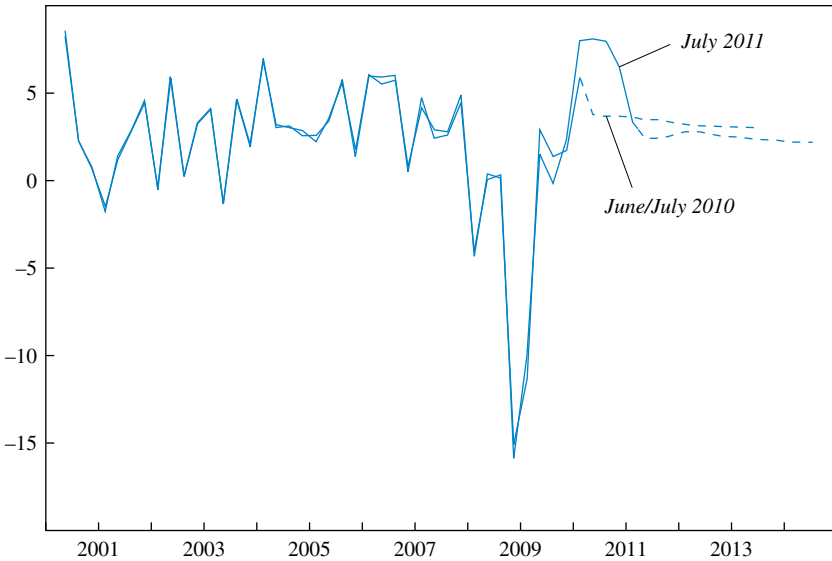
a. For each date, the thick solid line represents the most recently available estimates of realized GDP, the dashed line the Riksbank's GDP forecast, and the thin solid line the then-current estimate and forecast of potential GDP.

Figure 4, which shows the level of Swedish GDP over the recent period, and figure 5, which shows the GDP growth rate, give rather different impressions. In the summer of 2010, both realized and forecast output was quite low. Realized growth in 2010Q1 was high, 6 percent at an annual rate, but the forecast was not much above normal. Stabilizing growth at that low level of output would seem to amount to prolonging the recession. Stabilizing resource utilization would imply a very different policy.

The Riksbank's thrice-yearly *Monetary Policy Report* has also traditionally emphasized growth rather than the level of resource utilization, at least when it comes to the figures. The first four main graphs in each report show the repo rate path and the forecasts of GDP growth, CPI inflation, and CPIF inflation. In the July 2010 report, forecasts of employment, unemployment, and resource utilization do not appear until figure 18, on page 15, and later. It is less than obvious from that report that inflation and resource utilization are supposed to be the two target variables of the Riksbank.

Figure 5. GDP Growth, Realized and Forecast, Sweden^a

Percent per year



Sources: Sveriges Riksbank and Statistics Sweden.

a. For each date, the solid line represents the most recently available estimates of realized GDP growth (annualized), and the dashed line the Riksbank's GDP growth forecast.

My experience from practical monetary policy is that there is often considerable ambiguity and confusion between growth and levels of the real economy. I maintain that the level of resource utilization, not its growth rate, should be the relevant target variable for monetary policy. In particular, stabilizing growth after a big fall in output and a rise in unemployment will prolong the period of low resource utilization. Higher than normal growth is then warranted to return to the sustainable level of resource utilization.

IV.B. The Revision Argument

The outlook for the real economy at the June/July 2010 meeting was a bit better than had been projected at the previous meeting, in April 2010. Realized GDP growth was a bit higher, and realized unemployment a bit lower, than had been anticipated. This was mentioned as a reason for tightening policy. The argument seems to be that if the outcome for the real economy or inflation, or both, is higher (or lower) than anticipated, policy should be tightened (or eased) a bit. Of course, this assumes that previous

policy was optimal. If previously the policy was at a corner solution—for instance, with a binding ZLB—this conclusion does not follow. Unfortunately, the Riksbank’s communication was not clear about whether the period from April 2009 through April 2010, when the policy rate was 25 bp, was one of a binding effective lower bound or not (Svensson 2010a). Furthermore, since policy is never perfect, mechanically applying the above argument can mean that error is added to error, and policy could drift away from its optimum like a random walk. Therefore, policy should be checked against and mainly be based on forecasts of levels of inflation and resource utilization.¹⁵

IV.C. The Household Debt and Housing Prices Argument

Several Riksbank board members at several policy meetings have expressed worries about an increasing ratio of household debt to disposable income—in June/July 2010 it was about 170 percent—and about rising housing prices. The suggestion is that a policy rate increase would beneficially dampen the growth of household indebtedness and of housing prices. This raises two questions: first, whether household debt and housing prices present a problem for the macroeconomy or financial stability, and second, if they do, whether the policy rate is a suitable instrument to address the problem or whether there are other, better instruments.

On the first question, household debt is not considered to be a problem for financial stability in Sweden. The likelihood that Swedish banks would suffer any losses from mortgages is very small. The reason is that mortgages are full recourse, credit reviews are thorough (in part because mortgages are not securitized but stay with the initiating mortgage institution), and households’ capacity to repay debt is good. Not even during the severe crisis in the early 1990s did mortgage issuers incur any substantial losses from mortgage defaults. Sweden is indeed very different from the United States in these respects.¹⁶

Could household debt and housing prices cause problems for the macroeconomy? Several considerations suggest that the danger is small. First, model simulations of a fall in housing prices show that expansionary monetary policy can neutralize the negative effects on aggregate demand and inflation from a housing price fall, even taking into account the ZLB. Second, the assets of Swedish households (excluding pension claims) are, in the aggregate, three times their debt, so that household equity is two-thirds

15. The revision argument is further discussed in Svensson (2010b).

16. See Sveriges Riksbank (2010a, 2011d) and Finansinspektionen (2010).

of household assets, resulting in a quite low leverage. Nor is there any trend toward higher leverage. Third, the household saving ratio is high, so there is no evidence of aggregate consumption being financed by withdrawal of housing equity.¹⁷ Fourth, an ambitious Riksbank research project on the housing market (Sveriges Riksbank 2011d) has confirmed that housing prices are consistent with fundamentals and that there is no evidence of a bubble or overvaluation. If housing prices are consistent with fundamentals, then the fundamentals themselves would have to fall for housing prices to decline. This is a much more benign situation than a bubble that might burst. Finally, a debt-to-disposable income ratio as high as 170 percent is fully sustainable, and a constant ratio at this level requires only a very small “primary surplus” as a share of disposable income, when not only nominal interest payments but the households’ complete net cash flow, that is, net debt service considering after-tax interest payments and net amortization, is taken into account. (With a high 7 percent nominal mortgage rate, a 30 percent deductible capital income tax, and 4 percent nominal disposable income growth, only a steady-state primary surplus of about 1 percent of the debt-to-disposable income ratio is required; see appendix A3 in the online appendix for details.)

On the second question, even if household debt and housing prices were considered a problem, considerable research indicates that the policy rate has a limited impact on either (the two are highly correlated, since most household debt is in the form of mortgages), but that a rise in the policy rate can cause sizable collateral damage in the form of negative effects on inflation and real activity.¹⁸ A number of more efficient instruments are available to influence household debt and housing prices, such as loan-to-value ceilings, amortization floors, property taxes, and limitations on tax deductions.

In general, if there is some probability of a future housing price fall, and such a fall is expected to have an impact on future aggregate demand, resource utilization, and inflation, then that impact should be taken into account in constructing the mean forecasts of inflation and resource utilization. Then one could derive the correct implications for the policy rate. The impact could imply a downward shift of future resource utilization and inflation, which in itself would seem to imply more expansionary rather than contractionary policy. Furthermore, if the policy rate is deemed to have some

17. See Svensson (2010b) and Sveriges Riksbank (2010a, 2011d) and more recent *Financial Stability Reports* for further details.

18. See Assenmacher-Wesche and Gerlach (2010), Sveriges Riksbank (2011d), and references cited in Svensson (2010b).

effect on the probability or the magnitude, or both, of a housing price fall, this should also be taken into account. It could imply more contractionary policy, if a higher policy rate was deemed to reduce the probability or the magnitude of such a fall. But in the absence of such an analysis it is not clear what the policy implications are.

Donald Kohn (2006, 2008) mentions three conditions that should be fulfilled before central banks implement “extraordinary actions” to handle possible asset price bubbles, such as an unsustainable increase in housing prices: “First, policymakers must be able to identify bubbles in a timely fashion with reasonable confidence. Second, a somewhat tighter monetary policy must have a high probability that it will help to check at least some of the speculative activity. And third, the expected improvement in future economic performance that would result from the curtailment of the bubble must be sufficiently great.” These conditions will rarely be fulfilled in practice.

Occasionally, the minutes of the Riksbank meetings refer to the impact of the policy rate through household debt and housing prices on outcomes well beyond the forecast horizon of 3 years. However, the connection between these outcomes and the current policy rate is often difficult to articulate. Normally there is little or no information about the impact of the policy rate on the outcome beyond the forecast horizon. Responding to information that we do not really have only introduces random errors in policy.

IV.D. The Normalization Argument

Another argument is that, all else equal, low interest rates will lead to unspecified financial imbalances and unspecified threats to financial stability. This argument seems related to worries about increased leverage and increased risk taking—consistent with the so-called risk taking channel—and the misallocation of investment. Such arguments imply that, for given forecasts of inflation and resource utilization, more normal interest rate levels are preferred. It is similar to adding a term $(i_t - i^*)^2$ to the loss function, where i_t denotes the policy rate in period t and i^* denotes the normal policy rate. This term would represent undesirable impacts of lower-than-normal policy rates that are not included in the forecasts of inflation and resource utilization. There are several references to “normalization” in Riksbank press releases, *Monetary Policy Reports and Updates*, minutes, and speeches.

However, there is no evidence that low interest rates lead to more leverage or more risk taking in Sweden. The Swedish financial sector is dominated by an oligopoly of four large commercial banks, and there is

no shadow banking sector to speak of. There is no evidence that these commercial banks tend to increase their leverage when the policy rate is low.¹⁹ Furthermore, even if lower policy rates did lead to more risk taking, it does not follow that the resulting amount of risk taking would be too much. That depends on what the optimal level of risk taking is. In the wake of the financial crisis, it might be that risk aversion and the perception of uncertainty are exceptionally high and that there is overall too little risk taking. Without further analysis, this cannot be known.²⁰

The argument that low interest rates would lead to misallocation of investment is much weakened by the fact that the level of investment in Sweden has been very low and is still lower today than before the crisis. There has been little construction—certainly no construction boom—and no overinvestment in housing. The argument would further require a downward bias in the estimate of capital costs during the lifetime of the investments that are undertaken. I am not aware of any evidence of such bias.

Furthermore, the general discussion about policy rates, the risk taking channel, and so on, and the existing models, consistently seem to suffer from confusion between nominal policy rates and the general level of real interest rates. Models such as those of Tobias Adrian and Hyun Song Shin (2011) and Douglas Diamond and Raghuram Rajan (2011) include a short real rate but no nominal policy rate and no explicit monetary policy.²¹ Nor do they distinguish between the short real rate and the neutral (also called the natural) real rate. All that monetary policy can do by setting a short nominal policy rate is to temporarily make the short real rate deviate from the neutral real rate, which itself is beyond the control of monetary policy. The effects attributed to monetary policy should be the effects of that difference, not the level of the neutral rate or the overall level of the real rate. The neutral real rate is affected by many things and can remain low for many years for several reasons, including global imbalances, fiscal policy, and shocks to aggregate demand and

19. Plots of commercial banks' leverage against the policy rate show no systematic relationship between them.

20. Furthermore, the optimal adjustment of risk when real rates of return fall depends on the precise preferences for expected real rates of return and risk, as is revealed by the simplest mean-variance analysis when the investment line is shifted down. "Search for yield" regardless of the risk is difficult to understand in such mean-variance analysis, other than as the result of an unfortunate and ill-conceived unconditional promise of a particular rate of return, which regulators should prohibit.

21. Adrian and Shin (2011) and Diamond and Rajan (2011) also do not contain the frictions, such as sticky prices, that allow meaningful modeling of the effects of monetary policy.

supply. (Online appendix A5 provides an illustration with the simplest New Keynesian model.)

V. Arguments against the FOMC's Policy Easing

The argument *for* more expansionary U.S. monetary policy, if possible, in June 2010 is also straightforward: 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 rate. Indeed, noting these facts, Chairman Bernanke (2010b) concluded at the time, "Given the Committee's objectives, there would appear—all else equal—to be a case for further action." However, some arguments *against* more expansionary policy have been put forward. From my reading of the FOMC minutes and the broader debate about U.S. monetary policy, I find that the various arguments can be organized as follows:

- concerns about increased inflation and the anchoring of inflation expectations
- uncertainty about the effects of unconventional policy measures on the economy
- concerns about the possible negative effects of low policy rates for an extended period on financial stability and the allocation of investment
- concerns about estimates of the amount of slack in the economy
- concerns on the part of emerging-market policymakers that the policy would result in increased capital inflows into those countries, possibly generating bubbles and other negative impacts there
- concerns that the Federal Reserve's balance sheet would be more exposed to possible capital losses.

V.A. *Concerns about Increased Inflation and the Anchoring of Inflation Expectations*

One argument is that an expansion of the Federal Reserve's balance sheet risks reducing public confidence in the Federal Reserve's commitment to price stability. Some observers might erroneously think that a large increase in the balance sheet, since it implies a larger monetary base, will automatically bring higher inflation, especially since future circumstances may make it difficult to scale back the balance sheet quickly. This may increase longer-run inflation expectations, possibly with a ratchet effect, and ultimately require a recession to reduce them.

Why do inflation expectations matter for monetary policy? First, because all else equal, higher inflation expectations raise actual inflation and the

inflation forecast. If expectations instead are anchored on the central bank's inflation objective, it is easier for the central bank to stabilize both inflation and resource utilization. Second, they matter because the proximity of long-run inflation expectations to the inflation objective provides a good indicator of the central bank's credibility or, more precisely, of belief in its ability to attain the objective. This indicator is of some independent interest, for instance for policy evaluation. But, importantly, the mandate of the Federal Reserve (and of the Riksbank) includes price stability, not stability of inflation expectations. Inflation expectations should not be taken as an independent target variable. At most, they are an intermediate target variable, whose stability simplifies the stabilization of the actual target variables.

As an illustration, consider the standard New Keynesian Phillips curve,

$$(1) \quad \pi_t - \pi^* = \delta(\pi_{t+1|t} - \pi^*) + \kappa x_t + \varepsilon_t,$$

where π_t denotes inflation in period t , π^* is the inflation objective, δ is the private sector discount factor, $\pi_{t+1|t}$ denotes private sector expectations in period t of inflation in period $t + 1$, x_t denotes the output gap, ε_t denotes a possibly serially correlated cost-push shock, and κ is a positive constant.²² Shocks to private sector inflation expectations will, all else equal, imply shocks to inflation. Stable inflation expectations make it easier to stabilize inflation around π^* and the output gap around zero. Higher inflation expectations will, all else equal, imply higher actual inflation. Inflation expectations above π^* will, all else equal (zero cost-push shocks), require a negative output gap to keep inflation at π^* .

A good inflation forecast implicitly incorporates a forecast for inflation expectations. Note, however, that there is a risk of double counting: If inflation expectations are forecast to increase, and the inflation forecast takes this into account, the increase in inflation expectations contains no additional information that is not already contained in the inflation forecast. Responding to inflation expectations beyond the response to the inflation forecast could then be excessive.

Let $\pi_{t+\tau,t}$ denote the central bank's mean forecast in period t of inflation in period $t + \tau$. It is, by equation 1, given by

$$(2) \quad \pi_{t+\tau,t} = \pi^* + \delta(\pi_{t+\tau+1|t+\tau,t} - \pi^*) + \kappa x_{t+\tau,t} + \varepsilon_{t+\tau,t},$$

22. Calvo-style price-setting firms are assumed to index prices to π^* when not setting the optimal price.

and hence depends on the central bank's forecast in period t of private sector inflation expectations in period $t + \tau$, $\pi_{t+\tau+1|t+\tau,t}$, and on forecasts in period t of the output gap and the cost-push shock in period $t + \tau$, $x_{t+\tau,t}$ and $\varepsilon_{t+\tau,t}$. The effect of private sector inflation expectations is fully incorporated in the inflation forecast.²³

Arguably, an increase in shorter-run inflation expectations above the inflation objective would not actually be a problem in the current situation of a binding ZLB. On the contrary, a temporary increase would reduce the real interest rate and stimulate the economy and would therefore be desirable. Furthermore, according to Qvigstad's (2005) criterion, if the unemployment forecast is above the sustainable unemployment rate, optimality requires that the inflation forecast be above the inflation objective.

What would be a problem is if longer-run inflation expectations were to increase and require tight policy for a significant period to be brought down. Clear communication about the purpose of the expansion should mitigate the risk of a reduction in public confidence in the central bank's long-run commitment to price stability.

Regarding the increase in the monetary base that follows from the Federal Reserve's asset purchases, the fact that the Federal Reserve can pay interest on reserves means that a large monetary base no longer by itself leads to inflation. In the standard textbook treatment, a large monetary base implies a zero policy rate. But the Federal Reserve's ability to pay interest on reserves implies that a large monetary base does not prevent it from setting the policy rate at any level required to restrict aggregate demand and thereby limit inflation. Clear communication of this fact should reduce naïve beliefs of the opposite. Yet these beliefs seem quite stubborn, in spite of rather clear communication by the Federal Reserve. In any case, short- and long-run inflation expectations are monitored very closely in real time, and the Federal Reserve has the option of modifying its policy if inflation expectations start to move in undesirable directions.

Moreover, there seems little danger in the United States today of a ratchet effect in inflation expectations. The Federal Reserve's mandate of

23. Note that equation 2 incorporates the central bank's forecast of private sector inflation expectations, $\pi_{t+\tau+1|t+\tau,t}$, as a separate variable. This means that private sector inflation expectations need not be assumed to be rational, and the central bank's forecast for private sector inflation expectations can differ from its forecast for inflation. In the special case of rational expectations and symmetric information, the Phillips curve can be solved forward, private sector inflation expectations are endogenous and equal to the central bank forecast, and the inflation forecast depends only on the forecast or expectations of the output gap and the cost-push shock.

price stability is well established. Long-run inflation expectations are well anchored in the United States, as in the euro area and in other advanced countries with inflation targeting. As argued by Adam Posen (2011), nervousness about inflation expectations being sticky downward may stem from the stagflation experience in the 1970s. The struggle of some countries with bad inflation histories to achieve credibility for newly established targets in the early 1990s may also be a factor. But the success of inflation targeting in an increasing number of advanced and emerging-market countries in bringing low and stable inflation should dampen this nervousness.

Finally, the Federal Reserve's objective to stabilize inflation around the mandate-consistent rate should be interpreted as a symmetric objective. The mandate-consistent rate should not be interpreted as a cap on inflation (Evans 2011). Therefore, when unemployment is too high, inflation above the mandate-consistent rate is not in itself a problem. According to the Qvigstad criterion, it is instead a condition for optimal policy.

V.B. Uncertainty about the Effects of Unconventional Policy Measures

It has been argued that additional expansionary policy measures when the ZLB is binding may have limited effects on the economy, and because of this, that attempts by the Federal Reserve to use such measures might reduce its credibility and perceived competence, making it less effective at stabilizing inflation and resource utilization in the future.

There is a lively debate and now a considerable body of research on the effects of large-scale asset purchase programs (LSAPs).²⁴ Estimates based on a number of recent studies, as well as the Federal Reserve's own estimates, suggest that, all else equal, QE2 lowered longer-term interest rates by 10 to 30 bp. Federal Reserve analysis further indicates that such a reduction is roughly equivalent in its economic effect to reducing the federal funds rate by 40 to 120 bp (Bernanke 2011a)—a large amount. In simulations using the FRB/US macroeconomic model, discussed by Janet Yellen (2011b) and reported by Hess Chung and others (2011), QE2 is assumed to lower 10-year yields by about 15 bp, which would reduce the unemployment rate by about 0.3 percentage point and

24. See, for example, Chung and others (2011), D'Amico and others (2011), D'Amico and King (2011), Fuhrer and Olivei (2011), Gagnon and others (2011), Hamilton and Wu (2011), Krishnamurthy and Vissing-Jorgensen (this volume), Swanson (2011), and Wright (2011).

increase core PCE inflation by about 0.2 percentage point.²⁵ This is to my mind a substantial effect.

According to the so-called portfolio balance channel, LSAPs affect long-term interest rates by changing the quantity and mix of financial assets held by the public. This assumes that different financial assets are not perfect substitutes in investors' portfolios, so that changes in the net supply of an asset affect its yield and those of broadly similar assets.

LSAPs can be seen as a shortening of the duration of the public debt; they result in privately held public debt consisting of relatively fewer long-term Treasury bonds and relatively more deposits in the Federal Reserve. They also simply reduce the amount of Treasury securities available to the public, replacing them with deposits at the Federal Reserve. However, a change in the balance of new Treasury issues of short- and long-term debt can to some extent undo this shortening of duration (Hamilton and Wu 2011). Thus, cooperation by the Treasury, including a commitment not to undo the LSAPs, may be desirable and may increase their effect.

The Federal Reserve's purchases of Treasury securities, by removing substantial quantities of these securities from the market, should induce private investors to buy other assets that serve as substitutes for Treasuries, such as corporate bonds and mortgage-backed securities. The result is to reduce the yields and increase the prices of those other assets as well, lowering borrowing costs and easing financial conditions throughout the economy (Bernanke 2011a).

As discussed in section I, an increase in uncertainty that does not change the means (a mean-preserving spread) should normally not change the optimal policy. The direction of the optimal policy adjustment in response to increased and more complex uncertainty, such as model and multiplicative uncertainty, is usually not clear from the available information. Hence an increase in uncertainty by itself provides no reason to deviate from the normal response to the mean forecasts, that is, from the certainty-equivalent policy.

About a decade ago, many academics, including myself, criticized the Bank of Japan for not doing more when it faced the ZLB. The reason for its inaction seemed to be that the effectiveness of further policy measures was uncertain, and it was therefore safer not to try. As I wrote at the time (Svensson 2001), "The logic of this argument escapes me. Instead . . . it seems that, if a monetary expansion is deemed desirable, prudent policy calls for trying a number of the suggested remedies (as long as they are not inconsistent), in the hope that some may work." I remain convinced that

25. See Chung and others (2011, figure 10), for an estimate of the separate effect of QE2 ("phase 3").

uncertainty about the effects of unconventional policy is not a valid reason to do nothing. The Federal Reserve has indeed acted very forcefully in undertaking LSAPs, even though the magnitude of the effect on the economy was very uncertain *ex ante*.

V.C. Concerns about the Effects of Low Policy Rates on Financial Stability and Investment Allocation

Although I feel confident in rejecting this argument for Sweden (see section IV.D), I am less informed about the U.S. situation, with its substantial shadow banking sector and complicated supervisory and regulatory framework, with responsibilities divided among several authorities. Yellen (2011a) describes how the Federal Reserve is engaged in monitoring a number of indicators of potential financial market imbalances. These include indicators of asset valuations relative to historical norms such as forward price-to-earnings ratios in the stock market and price-to-rent ratios in the real estate market, as well as various measures of risk premiums and debt growth. The Federal Reserve has also intensified its monitoring of leverage, particularly outside the traditional banking system. This includes gathering both supervisory and market surveillance data and initiating an ongoing dialogue with a range of market participants to obtain more detail on the complex use of leverage in the shadow banking sector. At present, the Federal Reserve sees few indications of significant imbalances, and the use of leverage seems well below precrisis levels.

As noted in section IV.D, much theoretical and empirical work on the possible consequences of low interest rates on leverage and risk taking confuses the policy rate, the real rate, and the neutral real rate and does not appreciate that the relevant impact of monetary policy is the impact of temporary deviations of the short real rate from the neutral real rate. This means that the conclusions of this work for monetary policy are not clear.

The situation in the United States regarding the housing market and housing construction is hardly an argument against more expansionary policy. Continued housing price declines and a construction slump are rather arguments for more expansionary policy. As for any misallocation of investment, again, this requires a systematic bias in the estimates of capital costs during the lifetime of the investment.

In a second-best situation, without appropriate supervision and regulation, if the policy rate is the only available tool and there is a trade-off between its effect on the monetary policy objectives and financial stability, that trade-off should be taken into account. Normally, however, the policy rate is not the only available tool, and much better instruments are available for affecting financial stability. Monetary policy and the policy rate should be the last

line of defense, when other policy measures have been exhausted. Kohn's three conditions, discussed above, also apply here.

V.D. Concerns about Estimates of Economic Slack

It has been argued that there may be less slack in the U.S. economy than commonly appreciated, because the structural unemployment rate, the NAIRU, and the short-term equilibrium unemployment rate may have increased. For instance, the observed increase in longer-term unemployment may lead to an erosion of skills and the need to reallocate labor across sectors that require new skills, and may make the matching of the unemployed to vacant jobs more difficult. However, even if an increase in short-term equilibrium unemployment rates has occurred, it seems obvious that it is dwarfed by the large rise in unemployment during the crisis.

Furthermore, as discussed in section I and in Bernanke (2010b), the mandate-consistent unemployment rate should be the sustainable unemployment rate, that is, the long-run equilibrium unemployment rate. Thus, the relevant target variable, besides inflation, is the gap between unemployment and the sustainable rate, not that between unemployment and any short-run equilibrium unemployment concept. The latter is relevant for the impact on inflation and the inflation forecast, but not as a target variable. Using it as the target variable in effect introduces a preference for constant inflation, which I find difficult to motivate. (See online appendix A1 for more details.)

In particular, in a situation with high unemployment, increased longer-term unemployment, skills erosion, increased needs to reallocate labor, less effective matching, and thereby a higher short-run equilibrium rate (if this can be defined), expansionary policy may quickly drive unemployment down toward the sustainable unemployment rate, speed up the reallocation, limit the erosion of skills or speed the acquisition of new ones, and bring down not only actual unemployment but also the short-run equilibrium unemployment rate. The cost of this may be higher inflation, but this cost is appropriately taken into account by the squared gap between actual inflation and the mandate-consistent rate. The benefit is measured by the reduction in the squared gap between unemployment and the sustainable unemployment rate times the weight on that term.

V.E. Concerns about Increased Capital Inflows into Emerging Markets

Some policymakers in emerging-market economies have expressed concerns about increased capital flows into their countries and the related risks of bubbles and other negative effects there. However, the Federal

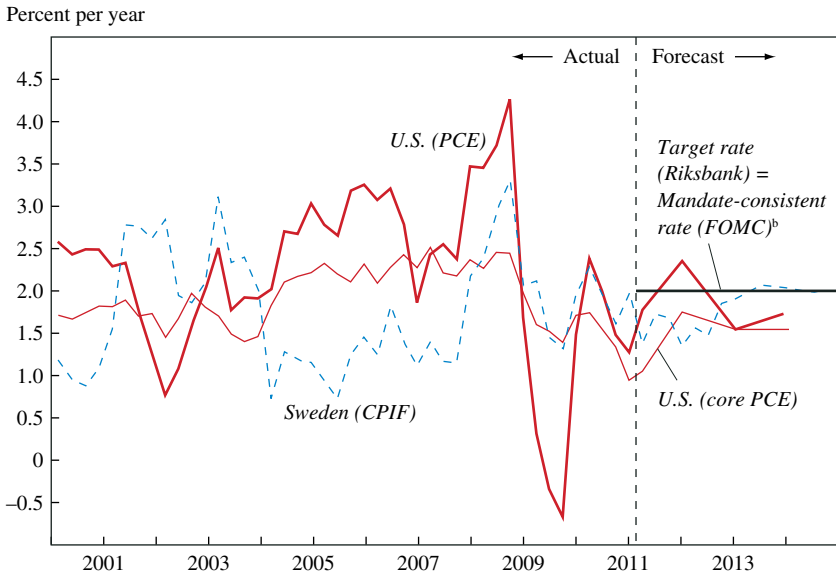
Reserve's mandate concerns only U.S. inflation and employment; it is not responsible for inflation, real developments, or monetary policy in other countries except as they feed back into the United States. That responsibility should rest with the policy authorities in those countries. Countries with a peg to the dollar will tend to import expansionary U.S. monetary policy, possibly causing the economy to overheat. A flexible exchange rate gives countries the option to run an independent monetary policy appropriate for the country. If countries nevertheless choose a dollar peg, and this results in capital inflows, bubbles, and other negative effects, they are themselves responsible for those effects.

In principle, more expansionary U.S. monetary policy, for instance in the form of lower long-term interest rates, tends to depreciate the dollar, all else equal. Does this mean that the United States is conducting a beggar-thy-neighbor policy? I do not see it that way. A weaker currency is a normal consequence of more expansionary policy in an open economy. Each of the countries affected has the option of adjusting its own monetary policy in response. All countries cannot depreciate their currency against each other, but all countries can conduct more expansionary policy if they prefer, whether through conventional or unconventional methods. Such a policy will increase real activity, world trade, and imports, which in a situation of underutilized resources is to the benefit of all. Monetary policy is not a zero-sum game.

V.F. Concerns about Federal Reserve Balance Sheet Losses

The Federal Reserve could indeed realize a loss when it sells its holdings of long-term Treasury bonds. However, any such capital loss for the Federal Reserve would be a (possibly unrealized) capital gain for the Treasury, so the consolidated government sector would not be affected. If capital losses by the Federal Reserve are considered a problem, a possible solution is for it to be compensated by the Treasury. Also, since the Federal Reserve can raise the interest rate on reserves, it need not sell assets to tighten policy but can keep them to maturity. Furthermore, central banks, unlike commercial banks, can operate with negative capital, as long as the income from their assets exceeds operating costs (including interest on reserves) by a sufficient margin, so that cash flow is positive. For the Federal Reserve to have a negative cash flow would require very high interest rates on reserves. Even then, it could actually sell assets to finance the negative cash flow for a long time (see Reis 2009 and Rudebusch 2011 for details). Nevertheless, these facts do not preclude that capital losses for the Federal Reserve might cause political or communication problems.

Figure 6. Inflation, Realized and June/July 2011 Central Bank Forecasts, Sweden and United States^a



Sources: Bureau of Economic Analysis, FOMC, Sveriges Riksbank, and Statistics Sweden.

a. The vertical line indicates 2011Q1, the last quarter for which inflation outcomes were available for the FOMC's and the Riksbank Executive Board's June/July 2011 meetings. The extensions to the right of the vertical line are the forecasts announced after those meetings.

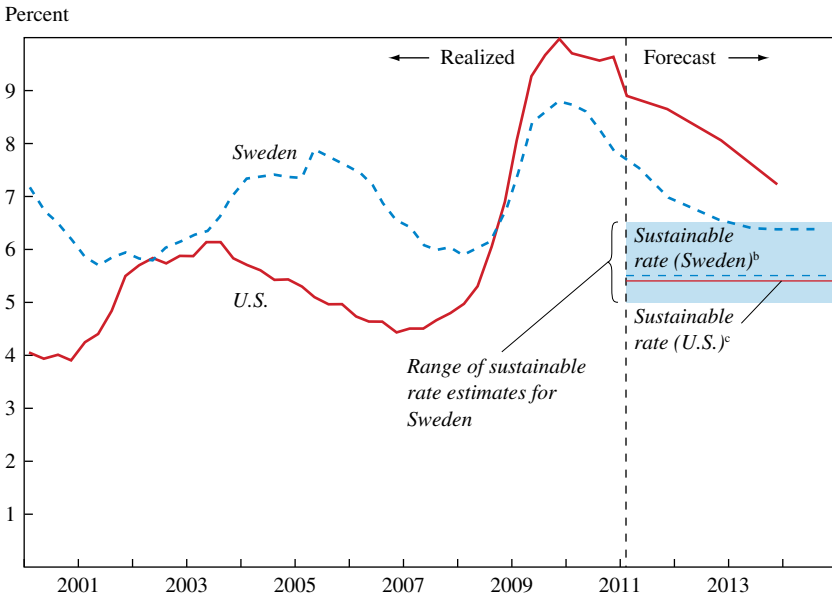
b. Median of FOMC participants' longer-run projections of PCE inflation as of the June 2011 meeting, rounded from 1.95 percent. The Riksbank's inflation target is also 2 percent.

VI. The Situation One Year Later

Figure 6 shows realized PCE and core PCE inflation and the FOMC's forecast, and realized CPIF inflation and the Riksbank's forecast, in the summer of 2011. The forecast for PCE inflation was by then above the mandate-consistent rate for 2011 and early 2012 but below that rate for the rest of 2012 and 2013. The forecast for core PCE inflation was below the mandate-consistent rate throughout the forecast period but consistent with the higher PCE inflation rate for 2011 because of temporary factors.²⁶

26. In the June 2011 minutes (FOMC 2011a), the FOMC provided the following clarification: "In the discussion of inflation in the statement, members decided to reference *inflation*—meaning overall inflation—rather than *underlying inflation* or *inflation trends*, in order to be clear that the Committee's objective is the level of overall inflation in the medium term" (italics in original). This indicates that the FOMC puts little weight on developments of PCE inflation in the short term.

Figure 7. Unemployment Rate, Realized and June/July 2011 Central Bank Forecasts, Sweden and United States^a



Sources: Bureau of Labor Statistics, FOMC, Sveriges Riksbank, and Statistics Sweden.

a. The vertical line indicates 2011Q1, the last quarter for which unemployment rate outcomes were available for the FOMC's and the Riksbank Executive Board's June/July 2011 meetings. Forecasts are those of the respective central banks announced after those meetings. The extensions to the right of the vertical line are the forecasts announced after those meetings. The series of Swedish realized unemployment rates differ from the one in figure 2 because of some data revisions, mainly before mid-2005.

b. Author's preliminary estimate.

c. Median of FOMC participants' projections of the longer-run rate, as of the June 2011 meeting.

The Riksbank's CPIF forecast was above the target for 2013 but below the target on average over the forecast period.

Figure 7 shows the corresponding unemployment forecasts. The FOMC's estimated sustainable unemployment rate was by then 5.4 percent,²⁷ higher than the June 2010 estimate of 5.1 percent. The Riksbank was still using 6.5 percent as the sustainable unemployment rate. Sweden's National Institute for Economic Research (2010) published an estimate of about 6.5 percent in June 2010, but in March 2011 it revised this down to just

27. The median of the participants' projection of the longer-run unemployment rate falls in the interval 5.35 to 5.55 percent, with a midpoint of 5.45 percent (FOMC 2011c). I round this to 5.4 percent.

above 6 percent (NIER 2011a).²⁸ In May it published a report estimating the sustainable unemployment rate at either 5 or 6 percent, depending on assumptions about the wage formation process (NIER 2011b). In April 2011 the Ministry of Finance (2011) published an extensive analysis of the effects of Sweden's substantial structural reforms, tax changes, and other factors, including demography and labor force composition, that have an impact on the sustainable unemployment rate. It arrived at an estimate of 5 percent. I consider this study the best analysis so far. My own preliminary estimate of 5.5 percent (Sveriges Riksbank 2010c) is approximately the midpoint between that of the Ministry of Finance and that of the NIER. The full range of estimates above is also indicated in the figure.

The FOMC's June 2011 unemployment forecast was above the sustainable rate. The Riksbank's forecast was on average above the range of estimates of the sustainable rate, and clearly above the estimates of the NIER and the Ministry of Finance and my own estimate. In this situation the FOMC (2011b) kept its policy rate unchanged, announcing that

The Committee continues to anticipate that economic conditions—including low rates of resource utilization and a subdued outlook for inflation over the medium run—are likely to warrant exceptionally low levels for the federal funds rate for an extended period. The Committee will complete its purchases of \$600 billion of longer-term Treasury securities by the end of this month and will maintain its existing policy of reinvesting principal payments from its securities holdings.²⁹

For its part, the Riksbank continued to raise the policy rate, this time from 1.75 percent to 2.0 percent, and announced (Sveriges Riksbank 2011b) that its forecast for the repo rate was unchanged. Deputy Governor Ekholm and I again dissented.³⁰

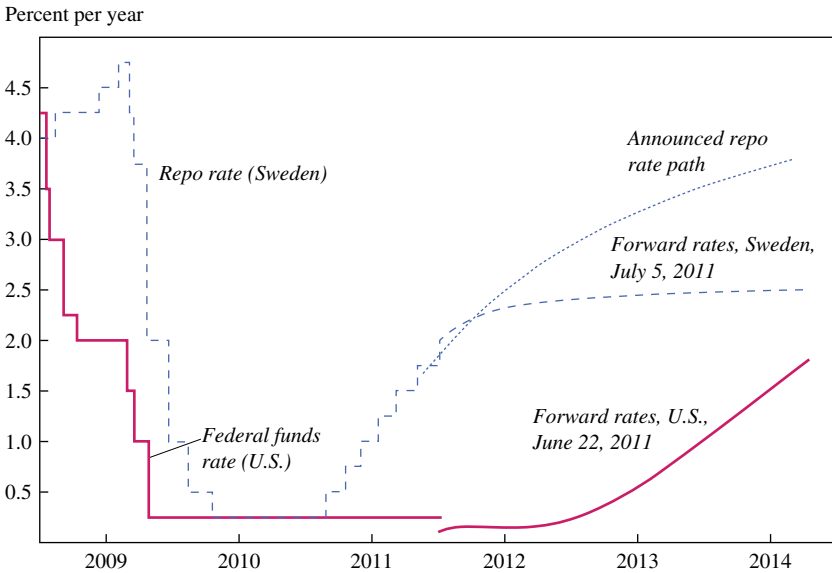
Figure 8 shows the federal funds rate and market expectations of future federal funds rates after the Federal Reserve's announcement. The market

28. Estimates of the sustainable unemployment rate are included in the longer Swedish versions of the publications.

29. In August 2011, after the outlook had deteriorated significantly during the summer, the FOMC increased the extended period and announced that it anticipated that economic conditions were likely to warrant exceptionally low levels for the federal funds rate at least through mid-2013. In September 2011 it introduced a new Operation Twist.

30. As stated in the press release (Sveriges Riksbank 2011b), we "preferred a repo rate equal to 1.75 per cent and a repo rate path that first rises slowly to 2 per cent in the third quarter of 2012 and then rises faster to about 3.8 per cent by the end of the forecast period. This is motivated by [our] assessment that the Report's forecasts for foreign policy rates and Swedish resource utilization are both too high. [Our] repo rate path would imply CPIF inflation closer to 2 per cent and a faster reduction of unemployment towards a longer-run sustainable rate." Online appendix A8 provides more details on why we preferred that path.

Figure 8. Policy Rates, Policy Rate Expectations, and Riksbank Policy Rate Path, June/July 2011, Sweden and United States^a



Sources: Reuters EcoWin and Sveriges Riksbank.

a. Forward rates are adjusted for normal forward term premiums (assumed to be 1 bp per month).

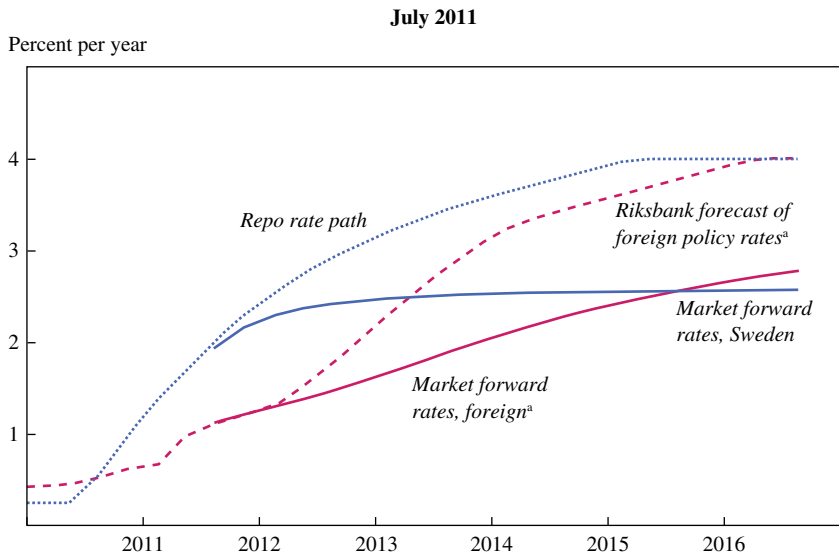
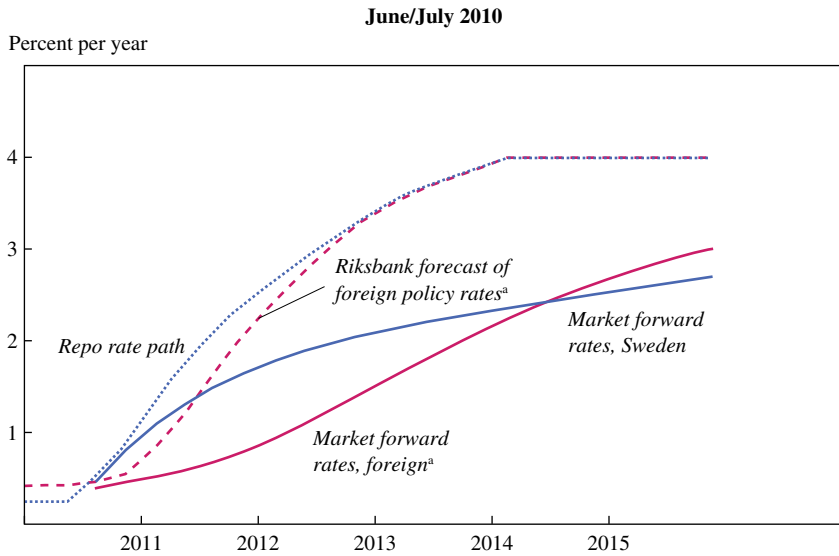
expected the federal funds rate to be exceptionally low for more than another year. The figure also shows the Riksbank's repo rate, the forward rate curve, and the announced policy rate path. The market still expected a noticeably lower path, more than 100 bp lower at the end of the forecasting period.

VI.A. Why Was the Riksbank Policy Rate So High?

The upward-sloping policy rate path in figure 8 reflects the Riksbank's intended policy in June/July 2011. The policy rate path is indeed very high compared with market implied forward rates and even higher compared with foreign implied forward rates, shown in the top panel of figure 9 (these rates are calculated using Total Competitiveness Weights, which are essentially Swedish trading-partner weights).³¹ One reason for the high Riksbank policy rate is that the Riksbank's forecast of foreign policy rates, also shown, was much higher than the foreign implied

31. The implied forward rates have been adjusted by a forward term premium of 1 bp per month. The curves have been extended beyond the standard 3-year horizon by me.

Figure 9. Riksbank Policy Rate Path and Foreign Policy Rate Forecast, and Market Forward Rates, 2010 and 2011



Sources: Reuters EcoWin, Sveriges Riksbank, and author's calculations.
 a. Calculated using Total Competitiveness Weights.

forward rates. The bottom panel of figure 9 shows that this divergence persisted in July 2011.

Indeed, Riksbank forecasts of foreign policy rates have been much above the implied forward rates since 2009. The forward rates have not been very good forecasts, but they have been much better than the Riksbank's (see figure A2 in the online appendix). The Riksbank's forecast for foreign policy rates has arguably been systematically too high for several years. A too-high forecast for foreign policy rates biases the repo rate path upward, all else equal. A higher policy rate path for foreign rates, all else equal, leads to a weaker forecast for the Swedish krona, and the Swedish repo rate path must then be higher to counteract this. Deputy Governor Ekholm and I consider it more appropriate to adopt a forecast for foreign policy rates that starts from implied forward rates and is then adjusted for any further information about foreign monetary policy intentions.

A second source of upward bias in the policy rate path is a possible overestimation of the sustainable unemployment rate (see above) and underestimation of potential output. The Riksbank's measures of potential output have shifted down substantially relative to precrisis levels (figure 4), implying a less negative output gap and a bias toward higher resource utilization. Potential outputs for September 2008 and June/July 2010 were constructed with a Hodrick-Prescott (HP) filter, which has a well-known endpoint problem, which implies that the output gap always tends to be closed at the end of the forecast horizon. Potential output for July 2011 is constructed using a new production function approach, but it retains the properties of an HP filter, and potential productivity is still estimated with an HP filter.

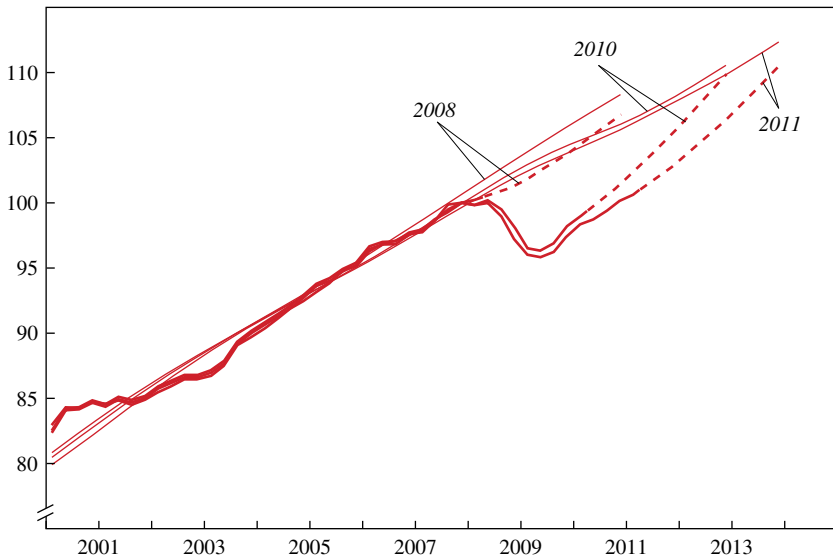
As discussed previously, if the shock to the Swedish economy was mainly a shock to aggregate demand through a fall in exports, it is not clear why potential output would be much affected. Nor is it clear why past potential output would have to be adjusted so much that 2007Q4 comes to be considered a boom as high as the recession in 2009Q9 was deep, particularly given that in September 2008, the boom in the previous year was considered quite moderate.³²

Figure 10 shows estimates and forecasts of U.S. potential output by the Congressional Budget Office (CBO) in September 2008, August 2010, and August 2011, together with FOMC forecasts of GDP in June 2008, 2010, and 2011. The figure shows that the CBO does not adjust past estimates of potential output as much as the Riksbank, nor do its estimates and forecasts

32. In figure 4, compare the large gap between 2007Q4 GDP and potential GDP as of June/July 2010 with the small gap between the 2007Q4 GDP and potential GDP as of September 2008.

Figure 10. GDP, Realized and Forecast, and Potential GDP, United States^a

Index, 2007Q4 GDP = 100



Sources: Congressional Budget Office and FOMC.

a. For each date, the thick solid line represents the most recently available estimates of realized GDP, the dashed line the FOMC's GDP forecast (as of June 2008, June 2010, and June 2011), and the thin solid line the CBO's estimate and forecast of potential GDP (as of September 2008, August 2010, and August 2011).

look like HP-filtered series. For these reasons, as discussed in Svensson (2011a), I have become skeptical about Riksbank estimates of potential output and regard the gap between unemployment and the sustainable unemployment rate as a more relevant, reliable, and transparent indicator of resource utilization as a target variable.

Online appendix A6 shows Riksbank policy alternatives in July 2011 under the assumption of forecasts of foreign policy rates in line with market forward rates and a sustainable unemployment rate of 5.5 percent. These alternatives are also discussed in the minutes of the July 2011 meeting (Sveriges Riksbank 2011a).

VI.B. Why Did the Swedish Economy Perform Better in 2010 than Forecast?

As reported above, at its June/July 2010 meeting the Riksbank began to raise the repo rate, even though inflation by the CPIF forecast was undershooting the target and the forecasts for all measures of resource

utilization were below sustainable levels. The Riksbank thus was tightening despite monetary policy not being well balanced to begin with, and despite Qvigstad's (2005) criterion for a well-balanced monetary policy not being met. Under these conditions one might have expected that the real economy would perform rather poorly. Instead, GDP growth in 2010 was more rapid than expected (figures 4 and 5). Although GDP in July 2011 was just above the precrisis level, it had increased much more than was forecast in June/July 2010. Unemployment, although still high, had also come down more than forecast (compare figures 2 and 7).

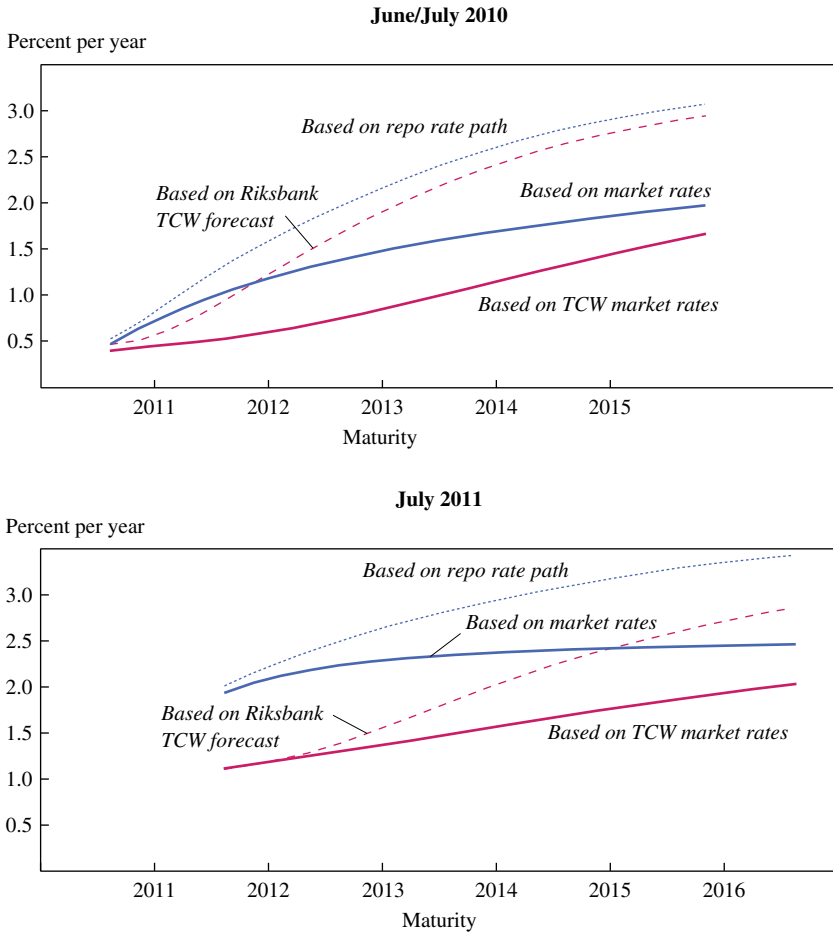
Does this better-than-expected performance mean that the policy tightening that began in June/July 2010 was not wrong but right *ex post*? Recall that when evaluating past policy, one must distinguish between evaluation *ex ante* and *ex post*, and that evaluation *ex post* largely means assessing whether policymakers were lucky or unlucky.

Had the Riksbank known in June/July 2010 that the Swedish economy would perform as well as it did, would it have been right to start tightening? My answer is no. A year later, inflation and the inflation forecast, although higher, were still too low, and unemployment and the unemployment forecast, although lower, were still too high. More expansionary policy in June/July 2010 would have had better results, with inflation higher and unemployment lower.

But why did the Swedish economy perform better than anticipated in the summer of 2010? Sveriges Riksbank (2011c) mentions higher-than-expected exports, domestic demand, and productivity. A possible explanation, not mentioned in that report, is that *actual* financial conditions (that is, the actual market term structure of interest rates) were substantially more expansionary than the *intended* financial conditions (the market term structure consistent with a credible policy rate path and normal forward term premiums). From the beginning of 2010 until July 2011, Swedish 5-year interest rates were on average about 85 bp lower than the average consistent with a credible policy rate path and normal forward term premiums. Thus, the Swedish economy may have benefited from the market effectively implementing a more expansionary policy than that intended by the Riksbank. But since forecast inflation was still too low and forecast unemployment too high, even more expansionary policy would have been better.

This can be seen from the top panel of figure 11, which shows the actual yield curve and the yield curve compatible with the repo rate path, both as of June/July 2010; the former represents actual financial conditions, and the latter represents intended financial conditions—it is the yield curve that would arise if the repo rate path were fully credible and credit and forward

Figure 11. Yield Curves, Sweden, 2010 and 2011



Sources: Reuters EcoWin, Sveriges Riksbank, and author's calculations.

term premiums were normal.³³ When the two curves differ, it is the former that affects the Swedish economy, not the latter. And according to the figure, they differed substantially: the actual 5-year interest rate at that time was slightly more than 100 bp lower than the 5-year rate compatible with the repo rate path. A regression of the 5-year rate on a 3-month rate indicates that a 100-bp increase in the former is equivalent to an increase in the

33. Recall that expected future short rates equal the forward rate less the forward term premium. Thus, with normal positive forward term premiums (such as the standard 1 bp per month), market expectations of future short rates are a bit below the forward rate curve. When forward term premiums vary and are substantial, one needs to treat market expectations of future short rates and the term structure of interest rates separately.

policy rate of between 200 and 300 bp. Such an increase would have been very bad for the economy and would have negatively affected the recovery. The krona would have appreciated substantially, reducing exports. Actual financial conditions were thus much more expansionary than those consistent with the policy rate path.

In fact, the 5-year rate has been well below the level consistent with the policy rate path since February 2010, and the bottom panel of figure 11 shows that in July 2011 the difference between them was still about 100 bp. As noted above, since the beginning of 2010, the difference has averaged almost 85 bp, equivalent to a reduction in the policy rate path of about 175 to 250 bp. Had the 5-year rate been on average 85 bp higher, the krona would, all else equal, have appreciated substantially, and the recovery would probably have come to a halt.

As mentioned, the effect of lower long-term rates has been discussed at length in the United States, in connection with the discussion of the effects of QE. A common view is that QE in total may have reduced 10-year rates by around 50 bp or more, primarily by lowering term premiums. According to several analyses (Chung and others 2011, Fuhrer and Olivei 2011, Yellen 2011b), this may have had significantly positive effects on the U.S. economy and prevented unemployment from being even higher and inflation from being even lower. Using a factor of 4 (as in Bernanke 2011a), a 50-bp-lower 10-year rate is equivalent to a federal funds rate reduction of about 200 bp, comparable to the range of 175 to 250 bp cited above for the repo rate.

VII. Conclusions

I have started from the observation that in the summer of 2010 the Federal Reserve and Riksbank forecasts for inflation and unemployment in their respective countries were quite similar. The forecasts for inflation were below the Federal Reserve's mandate-consistent rate and the Riksbank's inflation target, and the forecasts for unemployment were above the countries' sustainable rates. Such a situation would seem to call for more expansionary policy, if possible. But the Federal Reserve and the Riksbank chose dramatically different policies. The Federal Reserve maintained a minimum policy rate, started to communicate possible future easing, and in the fall launched QE2, while the Riksbank started a period of rapid policy tightening. I have examined the arguments against policy easing by the Federal Reserve and the arguments for policy tightening by the Riksbank and have found them unconvincing. Thus, in comparison I find that the

Federal Reserve in easing policy did the right thing, whereas the Riksbank in tightening policy did the wrong thing.

The Riksbank's policy rate path has been very high compared with Swedish market interest rates and foreign market interest rates. As a contributing explanation of the Riksbank's decision, I have pointed to a possible bias in the Riksbank's forecast of foreign policy rates, which is much higher than foreign implied forward rates. This effectively implies an assumption and a forecast of the foreign term structure of interest rates much above the actual one. I have also argued that the Riksbank's estimates and forecasts of potential output in recent years imply a bias toward estimates and forecasts of resource utilization that are too high. The gap between actual unemployment and an estimate of the sustainable unemployment rate is a more reliable and transparent indicator of resource utilization. Ambiguity regarding whether to target stable GDP growth or a stable level of resource utilization may also help explain the choice of a high policy rate path.

A year later, in July 2011, the Swedish economy had performed better than expected, whereas the U.S. economy had performed worse than expected. Sweden's good performance may largely be explained by the market implementing much easier financial conditions than what was consistent with the Riksbank's policy rate path. There were also upward revisions of GDP data. This better-than-expected performance does not mean that the Riksbank's tightening was right *ex post*; performance would have been better with easier policy and financial conditions. The poorer U.S. performance depends on factors other than monetary policy, including fiscal policy problems (too large a subject to address here), a slow recovery of the housing market, and substantial downward revisions of GDP data. Performance would have been even worse without the Federal Reserve's policy easing. In short, the Riksbank did the wrong thing but was lucky, whereas the Federal Reserve did the right thing but was unlucky.

What broader conclusions can be drawn from these examples of practical monetary policy? One is that a simple and transparent monetary policy framework has great benefits. The dual mandate of the Federal Reserve and the flexible inflation targeting of the Riksbank provide such frameworks. Both boil down to "forecast targeting," that is, setting the policy rate and choosing a policy rate path (and managing the central bank's balance sheet) so as to best stabilize the forecast of inflation around the inflation objective and the forecast of resource utilization around a sustainable level. Furthermore, a single inflation index, a single measure of resource utilization, and

a measure of stability need to be specified. It is important not to confuse measures of resource utilization that are to be used as indicators of inflationary pressures with those that are to be used as target variables. For the latter purpose, the gap between the actual and the sustainable unemployment rate seems more reliable and transparent than the alternatives. I am convinced that the framework is more effective if only one inflation index and only one measure of resource utilization are chosen. When multiple measures are used, the framework becomes more opaque and accountability becomes difficult to enforce: policymakers can often find at least one or two that are close to the desired level and thus can motivate quite different policies.

Such a simple and transparent framework is a great help to policymakers in making the right decision and motivating this decision. Publishing the central bank's forecasts of inflation and resource utilization also makes external evaluation easier and more effective and makes it possible to hold powerful and independent policymakers accountable for their decisions. The present assessment of Federal Reserve and Riksbank monetary policy could not have been written without the public availability of their forecasts.

Finally, I remain quite suspicious of arguments that a lack of instruments, doubts about policy effectiveness, or other concerns are reasons why one should not try to best stabilize the forecasts of inflation and resource utilization around their desired levels. Such arguments often seem too vague and lacking in substance to be convincing.

ACKNOWLEDGMENTS The views expressed here are my own and are not necessarily shared by the other members of the Riksbank's Executive Board or the Riksbank's staff. I am grateful for helpful comments from and discussions with Hanna Armelius, Claes Berg, Alan Blinder, Bernard Dumas, Karolina Ekholm, Jon Faust, Martin Flodén, Gabriela Guibourg, Jesper Hansson, Donald Kohn, Stefan Laséen, Andrew Levin, Jesper Lindé, Edward Nelson, Bengt Pettersson, Raghuram Rajan, Ulf Söderström, Ingvar Strid, Staffan Viotti, Karl Walentin, Jonathan Wright, Janet Yellen, my discussants Randall Kroszner and David Wessel and other participants in the Brookings Papers conference, and the editors. I thank, without implication, Riksbank staff members Magnus Åhl, Björn Andersson, and Mikael Apel for contributions to the paper. From May 2007, I serve a 6-year term as deputy governor of the Riksbank and one of the six members of the Riksbank's Executive Board.

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Comments and Discussion

COMMENT BY

RANDALL S. KROSZNER This paper by Lars Svensson raises a fundamental question in monetary policy: would you rather be lucky, or would you rather be right? In his extremely valuable and comprehensive comparison of monetary policy decisions and outcomes in Sweden and the United States during 2010–11, Svensson argues, “The Riksbank did the wrong thing [by tightening policy] but was lucky, whereas the Federal Reserve did the right thing [by easing policy] but was unlucky.”

Of course, you would prefer to be both right and lucky. Whether you would rather be right or lucky depends, perhaps, on whether you are an academic or a policymaker. If you are an academic, you always want to be right. You couldn’t care less about luck. If you are a policymaker, however, it is difficult to ignore actual outcomes when, for example, you testify before Congress. You can explain that a policy choice was right based on information available *ex ante*. If the unemployment rate zooms up a year later through bad luck, however, you may have a difficult time convincing members of Congress and the public of the wisdom of that policy choice, regardless of the support you may have in the academic community. I certainly wish the United States had had a bit more “luck of the Swedish” when I was at the Federal Reserve in 2006–09.¹

I cannot do justice here to all of the important issues and arguments, *ex post* and *ex ante*, that Svensson covers in his careful and detailed comparison. I very much concur that, despite the differences in the statutory language that sets out the dual mandate of the Federal Reserve and the

1. It seems that Svensson would tend to side with the academics in preferring to be right, saying, “Evaluation *ex ante* is more relevant when assessing the quality of policy decisions, whereas evaluation *ex post*, although still interesting, largely means assessing whether the policymaker was lucky or unlucky.”

flexible inflation targeting of the Riksbank, in practice they both operate as “forecast targeting” regimes. Svensson defines forecast targeting as “setting the policy rate and choosing a policy rate path (and managing the central bank’s balance sheet) so as to best stabilize the forecast of inflation around the inflation objective and the forecast of resource utilization around a sustainable level” (see also Kohn forthcoming, Woodford 2007). The Riksbank has a statutory mandate to keep annual inflation around 2 percent. The Federal Reserve, as revealed in the range of “long run” forecasts by individual Federal Open Market Committee (FOMC) members, for some years effectively targeted inflation at around 2 percent and recently announced an explicit inflation goal of 2 percent.

This focus on the forecasts strikes me not only as an accurate characterization of monetary policy practice in United States and Sweden but also as exactly right. Central bankers should try to make policy looking through the windshield rather than the rearview mirror. Getting the forecast right, of course, is a great challenge, and has been particularly so during the last few years of tremendous economic and market turbulence.

Going hand in hand with the focus on forecasts is a focus on expectations, since the forecasts and the impact of monetary policy will depend heavily upon the expectations of market participants. As Svensson emphasizes, “What is *possible* depends . . . on restrictions such as the zero lower bound (ZLB) on interest rates, *the ability to manage expectations of future policy rates and inflation*, and the availability of unconventional policy tools such as the size and composition of the central bank’s balance sheet” (emphasis added).

I will focus here on the relationship between expectations management and communication strategy in monetary policy. I do so for three reasons. First, I believe expectations management is a tremendously important part of practical monetary policy (see, for example, Friedman 1968). Second, although I almost completely agree with Svensson’s analysis of both U.S. and Swedish monetary policy during this period, I draw a different conclusion from his cross-country comparison about the impact of central bank communication on credibility and expectations management. Finally, as I believe the paper illustrates, how central bank communication affects expectations formation in practice is much less well understood than theory would suggest (I sometimes joke that we have a “faith-based” monetary policy in this respect), and thus we need significantly more empirical research to assess the effectiveness of different forms of central bank communication and transparency on expectations formation and credibility. This is particularly relevant given the recent announcement by the Federal

Reserve that it would adopt two features of the Riksbank's communication policy, namely, the adoption of an explicit inflation goal and the publication of the FOMC members' forecasts of the federal funds rate.

The key question is: does greater transparency mean greater credibility? The Swedish central bank provides a level of transparency that is among the highest—if not the highest—of any central bank in the world. The day after the Executive Board of the Riksbank meets to determine monetary policy, it issues a detailed press release explaining “the most important reasons for and the considerations behind” the decision, and the governor of the Riksbank holds a press conference.² Although the statements issued immediately after each FOMC meeting have grown in length under Chairman Bernanke, they are still not as long as the Riksbank's press releases. In addition, Chairman Bernanke has recently introduced postmeeting press conferences, but not after each meeting.

In Sweden, 2 weeks after the Executive Board meets, the Riksbank publishes minutes that detail the discussion, including the positions taken by the individual board members. In the United States, 3 weeks after the FOMC meets, the Federal Reserve publishes minutes that summarize the issues discussed, but the public must wait 5 to 6 years for the meeting transcript that gives the details of positions taken by individual members. Naturally, in both Sweden and the United States, the members of the policymaking committees give speeches from time to time describing their personal views on the economic outlook and monetary policy.

The Riksbank in addition regularly publishes a report that includes its staff's central forecasts for economic activity and inflation as well as forecasts under alternative assumptions about economic developments. As the Riksbank website describes, this report “functions as a basis for the press release that announces the interest rate decision.”³ Before each FOMC meeting, the FOMC members receive the Federal Reserve Board staff's forecasts for economic activity and inflation under a scenario considered most likely as well as under alternative scenarios. This “Teal Book” forecast (named after the color of the document's cover), however, is not shared with the public.

Both the Riksbank and the Federal Reserve regularly publish projections of inflation, growth, and unemployment by the members of their

2. The quotation is from Sveriges Riksbank, “Forecasts and Interest Rate Decisions” (www.riksbank.com/templates/Page.aspx?id=10546), which describes the monetary policy-making process.

3. The quotation is from the Riksbank document cited just above.

policymaking committees, but until recently with one crucial difference between them (aside from the fact that the Riksbank publishes means of these projections, whereas the Federal Reserve publishes only the range). After each meeting the Riksbank announces an expected multiyear path for its policy rate (the “repo” rate), upon which the economic projections are based. In contrast, each FOMC participant made projections based upon his or her assessment of “appropriate monetary policy.” Individual FOMC members did not specify what they assumed to be appropriate monetary policy, and hence there was no announcement of the Federal Reserve’s underlying expected path of the federal funds rate.⁴ As Svensson describes it for the period he is analyzing, “The [Federal Reserve’s] *intended* monetary policy and financial conditions are not directly available. . . . [whereas] for the Riksbank both intended and actual financial conditions are directly available” (emphasis in original). Since 2012, however, the Federal Reserve has begun to publish the FOMC members’ projections of the federal funds rate path.⁵

In the summer of 2010, as Svensson describes, the Riksbank not only raised the policy rate from 0.25 percent to 0.5 percent but also announced an expected policy rate path involving a steep tightening of policy. The Riksbank followed through with interest rate increases over the next year. Svensson and one other member of the Executive Board dissented from this initial decision and from subsequent decisions that raised the policy rate to 2 percent by mid-2011. They believed that the Riksbank should not be raising rates during this period. Just as the Riksbank began its tightening cycle in the summer of 2010, the Federal Reserve began to move in the opposite direction by discussing the possibility of easing through asset purchases. That fall the Federal Reserve launched the \$600 billion asset purchase program that has come to be known as QE2.

Here is where the distinction between being right and being lucky arises, as well as the key role of expectations management (or lack thereof). As Svensson explains,

That the Swedish economy nevertheless grew faster than expected may largely be explained by *the market implementing an actual yield curve that was lower*

4. Prior to 2012, before each FOMC meeting, Federal Reserve staff reported to the members the expected federal funds rate path that the staff assumed in making the Teal Book forecasts, but the members did not systematically provide information about their own assumptions to each other or to the staff.

5. See the Federal Reserve’s press release of January 20, 2012, at www.federalreserve.gov/newsevents/press/monetary/20120120a.htm.

than implied by the policy rate path, so that actual financial conditions were much more expansionary than the Riksbank intended. That the U.S. economy performed worse than expected is due to factors other than monetary policy. (emphasis added)

Thus, Sweden got lucky because the Riksbank was unsuccessful in managing expectations and its policy rate forecasts lacked credibility.

I believe this episode illustrates a fundamental tension in the paper, with important lessons for how primitive is our understanding of the relationships between transparency, expectations formation, and central bank credibility. This extremely transparent central bank not only provided a detailed explanation for its tightening cycle but actually implemented it over the next year exactly as it had said it would. The markets, however, did not align their expectations with those of the central bank, either after the initial announcement or after each of the interest rate increases that were consistent with the original announcement. (See the Riksbank minutes after each meeting in 2010 and 2011, and Svensson's figures 3 and 8.) The markets seemed consistently surprised during this period. It does not seem possible to me that the Riksbank could have been any more clear and transparent about what it intended to do over this period, but somehow it failed to convince the markets.

In other circumstances, however, the markets have taken the Riksbank's transparent projections more seriously. As Svensson recalled during the general discussion of his paper at the Brookings Panel meeting, before early 2009, markets would move immediately to align with the Riksbank's announced path of future interest rates, but since then market expectations have sometimes been above and sometimes below the announced path. It is difficult to explain why these policy announcements had such high credibility before the crisis but not since. I am at a loss to find a systematic explanation, either a traditional economic or a behavioral one, of why the same communication strategy changed market expectations in one circumstance and not in the other.

More broadly, the paper underscores how little we grasp about the linkages between what a central bank says and expectation formation, as well as between expectations and behavior.⁶ Certainly, the U.S. experience of the 1970s shows how a central bank can broadly lose credibility, and Chairman Paul Volcker's actions in the early 1980s appear to have restored

6. During my time at the Federal Reserve, I raised such concerns about a lack of systematic empirical work on these linkages in internal discussions of communication strategy and the possibility of adopting an explicit inflation target.

it for the Federal Reserve. But we typically have less insight into why some beliefs about central banks seem to stick while others change. Svensson himself gives a current example:

But the Federal Reserve's ability to pay interest on reserves implies that a large monetary base does not prevent it from setting the policy rate at any level required to restrict aggregate demand and thereby limit inflation. Clear communication of this fact should reduce naïve beliefs of the opposite. Yet these beliefs seem quite stubborn, in spite of rather clear communication by the Federal Reserve.

Interestingly, the Federal Reserve seems to have been very effective in changing and managing market expectations in its policy announcements in 2010 and 2011. In August 2011, for example, the FOMC significantly altered its communication strategy regarding the future path of interest rates. Since 2009 the FOMC has made a commitment to keep the federal funds rate near zero for an undefined "extended period." In August 2011 it provided greater clarity and transparency by committing to keep rates near zero until mid-2013, although the commitment is conditional on the economic situation. This commitment to a path of interest rates for a specific period is much closer to what the Riksbank does than what the Federal Reserve has traditionally done. Three members of the FOMC, however, dissented from making the multiyear commitment. Although this was the largest number of dissents on any vote since Bernanke became chairman, the markets found the majority's statement credible, and federal funds futures immediately moved into alignment. More work needs to be done to explain why the same type of communication strategy was so effective in the United States, in spite of the dissents, and not effective in Sweden, in spite of a tradition of high overall transparency.

In their paper in this volume, Arvind Krishnamurthy and Annette Vissing-Jorgensen present event-study evidence that the Federal Reserve's announcements related to its asset purchase programs (QE1 and QE2) had important immediate impacts on inflation expectations. Normally, one associates an increase in inflation and inflation expectations with an increase in inflation uncertainty. For the announcements they examine for QE1 and QE2, however, their measures of uncertainty and volatility declined. These results suggest that the Federal Reserve's communication strategy and its policy actions were successful in raising inflation expectations (most likely by reducing the probability of deflation) while also preventing expectations from becoming unanchored. That is, markets shifted their inflation expectations up somewhat, but their uncertainty about their estimate of future inflation seems to have been reduced rather than increased.

Reducing uncertainty and providing greater clarity to markets is one important goal of central bank transparency and communication. The Federal Reserve seems to have achieved that in its announcements about QE1 and QE2 without adopting a Swedish-style communication structure.⁷ These results once again raise the question of what approaches to transparency and communication are most effective. I am sure the question of how best to ensure that inflation expectations are well anchored is still much debated around the FOMC table. Certainly much more empirical analysis is needed of what actions and communication strategies in practice anchor or unanchor expectations in different circumstances to address these important issues.

Examining effects on uncertainty and volatility, as Krishnamurthy and Vissing-Jorgensen do, is one way to begin to address the issues. More generally, assessing the signal-to-noise ratio of different types of communication strategies in different circumstances would be valuable. Might some types of transparency introduce noise and confusion? Is providing detailed information about the forecast and the expected policy rate path effective? Or does bad luck, which would cause significant revisions of these forecasts, have the potential to undermine the central bank's credibility? What is the appropriate horizon over which to make the forecasts most effective? Do longer-range forecasts, say, over a 3-year horizon, lack credibility? What types of statements, coupled with what types of actions, are most effective? Does that vary with circumstances? What is the role of dissent and of public statements by members with different views? Does that cacophony just generate noise and uncertainty, or does it help to clarify the arguments for the public?

Monetary policy practice may have been transformed by the recent asset purchase programs of central banks around the world, from Japan to the United States to the United Kingdom to the European Union. The next logical step is greater transparency and forward guidance about the expected future path of a central bank's portfolio size, duration, and composition, not just its preferred path of interest rates. The new communication strategy of the Federal Reserve has taken a first step in this direction.

Overall, although I am sympathetic to Svensson's conclusion that "a simple and transparent monetary policy framework has great benefits,"

7. This is true in the short run, at least. The event study results will have to be compared with other econometric (vector autoregressive or dynamic stochastic general equilibrium) frameworks to try to tease out the longer-run impacts.

it seems surprising that he concludes that “such a simple and transparent framework [as those employed in Sweden and the United States] is a great help to policymakers in making the right decision and motivating this decision,” given that he argues that the Riksbank “did the wrong thing” in 2010 and continued to make the “wrong” decision by following through on its promised tightening. The Riksbank was “saved” only because the markets did not find its policy rate projections credible and moved in the opposite direction. Was this just luck, or might we need to dig deeper to try to understand what constitutes clear and transparent central bank communication that enhances credibility, allows for the management of expectations, and fosters the effective implementation of the chosen policy?

Svensson’s thoughtful analysis of U.S. and Swedish monetary policy and market responses forces us to confront crucial questions about the linkages between communication strategy, expectations management, and central bank credibility. Given that the Federal Reserve has now adopted key elements of the Swedish communication strategy, one can examine the consequences of this approach using U.S. data. Let us hope that both researchers and policymakers will be lucky enough to get the answers right.

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COMMENT BY

DAVID WESSEL In this paper Lars Svensson juxtaposes two central banks facing similar forecasts of inflation below and unemployment above target. The Federal Reserve, he concludes, did the smart thing and was

unlucky; the Sveriges Riksbank did the wrong thing and was lucky. In other words, in central banking, as in so many other things, life isn't fair.

Svensson emphasizes the similarities between the economic forecasts confronting the two central banks in mid-June 2010 and asserts that they have more or less the same mandate and the same economic framework. He chooses not to dwell on the fact that the Riksbank is the central bank of a small open economy—Sweden's GDP is smaller than that of Ohio—whereas the Federal Reserve is the central bank for the world's largest economy and the trustee of the world's reserve currency. The moment he chooses for his comparison, June 2010, is convenient. It is a month in which Federal Reserve officials published an economic forecast, and a month in which the Riksbank decided to begin raising interest rates. The timing is not perfect, however. The Federal Reserve decided in June only to reaffirm its commitment to keeping rates “exceptionally low . . . for an extended period”—indeed, the minutes of the Federal Open Market Committee's (FOMC) meeting show an extended discussion of exit strategies. It was only in early August 2010 that the Federal Reserve decided to reinvest the proceeds of maturing securities that it had purchased in its first round of quantitative easing (QE1), in late August that Chairman Ben Bernanke essentially unveiled QE2, and in November that the Federal Reserve formally launched QE2. Nonetheless, the contrast between the policies pursued by the two central banks is striking and instructive. Svensson's paper offers a useful model for those who would evaluate central bank decision-making, both given the information available to policymakers at the time of a decision and given subsequent developments.

I have three observations on the argument and the scope of the paper: First, the precise legal mandate of a central bank matters more than Svensson suggests. Second, Svensson does not give enough consideration to the case that the Federal Reserve should have done more easing in June 2010. Third, he leaves unexplored the issue of whether the composition of the monetary policy committee—or even the existence of a committee as opposed to a single governor—makes for better or worse decisions at moments like June 2010.

MANDATES MATTER Svensson argues that in practice, the mandates of the Riksbank and the Federal Reserve look the same, and the evidence he offers supports that. However, I am a bit wary about generalizing from this to the conclusion that the difference between a central bank with a formal single mandate and one with a formal dual mandate is insignificant.

Swedish law says, “The objective of the Riksbank's activities shall be to maintain price stability. The Riksbank shall also promote a safe and efficient

payments system.”¹ U.S. law says, “The Federal Open Market Committee shall maintain long run growth of the monetary and credit aggregates commensurate with the economy’s long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates.”² And the treaty that governs the European System of Central Banks (ESCB, which comprises the European Central Bank, or ECB, and the central banks of the EU member states) says, “The primary objective of the ESCB shall be to maintain price stability.” It also says that “without prejudice to the objective of price stability, the ESCB shall support the general economic policies in the Community with a view to contributing to the achievement of the objectives of the Community as laid down in Article 2.”³ That article provides that the objectives of the European Union are a high level of employment and sustainable and noninflationary growth.

Available evidence, particularly in the past few years, suggests that the differences in the mandates of the Federal Reserve and the ECB have had consequences. Consider the following two statements, the first from Jean-Claude Trichet, then-president of the ECB, and the second from Charles Evans, president of the Federal Reserve Bank of Chicago.

Trichet, amid all the financial instability in Europe and predictions that risks of recession in Europe were rising, said at a September 2011 press conference:

We were called to deliver price stability! We were called on by all the democracies of Europe to deliver price stability. . . . We have delivered price stability over the first 12–13 years of the euro! Impeccably! I would like very much to hear some congratulations for this institution, which has delivered price stability in Germany over almost 13 years at approximately 1.55%—as the yearly average of inflation—we will recalculate the figure to the second decimal. This figure is better than any ever obtained in this country over a period of 13 years in the past 50 years. So, my first remark is this: we have a mandate and we deliver on our mandate!⁴

1. Sveriges Riksbank, “The Sveriges Riksbank Act.” www.riksbank.com/templates/Page.aspx?id=28393.

2. Board of Governors of the Federal Reserve System, “Federal Reserve Act: Section 2A. Monetary Policy Objectives.” www.federalreserve.gov/aboutthefed/section2a.htm.

3. European Central Bank, “Tasks.” www.ecb.int/ecb/orga/tasks/html/index.en.html.

4. ECB, “Transcript of the Questions Asked and the Answers Given by Jean-Claude Trichet, President of the ECB, and Vitor Constâncio, Vice-President of the ECB.” www.ecb.int/press/pressconf/2011/html/is110908.en.html#qa. Benjamin Friedman has called my attention to the eerie similarities between these words and those that Friedman, in the opening paragraphs of a defense of the Federal Reserve’s dual mandate (Friedman 2008, p.153), puts in the mouth of a hypothetical central banker and then deems “unthinkable.”

Evans, in a speech delivered the same week as Trichet's press conference, said:

In the United States, the Federal Reserve Act charges us with maintaining monetary and financial conditions that support maximum employment and price stability. This is referred to as the Fed's dual mandate and it has the force of law behind it. The most reasonable interpretation of our maximum employment objective is an unemployment rate near its natural rate, and a fairly conservative estimate of that natural rate is 6%. So, when unemployment stands at 9%, we're missing on our employment mandate by 3 full percentage points. That's just as bad as 5% inflation versus a 2% target. So, if 5% inflation would have our hair on fire, so should 9% unemployment. (Evans 2011)

The economic rigidities, fiscal policies, and institutional arrangements in the United States are, of course, significantly different from those in Europe. But surely one reason that Federal Reserve policy has consistently been easier than that of the ECB—and, I would argue, easier than the policy that the ECB policymakers would pursue if they confronted a U.S.-style situation—is this difference in mandates, one rooted in the differences between the German collective memory of the hyperinflation of the 1920s and the American collective memory of the Great Depression.

LOOKING AT ONLY ONE SIDE OF THE COIN Svensson inspects and rejects all the arguments for tighter policy that the Federal Reserve rejected. He does not, however, consider the case for more aggressive easing than the Fed undertook in June 2010—or in the months that followed. What if, for instance, it had launched QE2 at that time instead of in November? What if it had been \$1.2 trillion instead of \$600 billion? What if it had been quicker to give explicit forward guidance, saying in June 2010 instead of August 2011 that it planned to hold short-term rates near zero until 2013? What if Operation Twist 2.0, the selling of short-term securities from its portfolio to buy longer-term securities, had been part of the early rounds of quantitative easing? What if, as the Federal Reserve was considering in the fall of 2011, it had purchased more mortgage-backed securities?

Svensson offers a full-throated defense of the policy the Federal Reserve chose, and an attack on the case for tighter policy, but nothing much on the case for easier policy in June 2010. As for today's monetary policy, Svensson is explicitly silent, explaining in a footnote that "being a central banker, in line with central bank custom I will refrain from commenting on the current and prospective policies of other central banks."

But let's look back at June 2010. As the FOMC minutes note, "The economic outlook had softened somewhat and a number of members saw the

risks to the outlook as having shifted to the downside. . . . the Committee would need to consider whether further policy stimulus might become appropriate if the outlook were to worsen appreciably” (FOMC 2010). What does the framework that Svensson employs tell us about whether the FOMC made the right call in June 2010 not to launch easing then, or indeed about the magnitude of the steps the committee took later? What did the committee misread *ex ante*? Is there anything one can see *ex post* that they should have anticipated *ex ante*? On this, Svensson is unfortunately silent. Yet given subsequent developments in the U.S. economy and the luxury of hindsight that time provides, the case that Federal Reserve policy was not easy enough in June 2010 deserves examination.

COMMITTEE VERSUS INDIVIDUAL DECISIONMAKING Svensson does a good job of describing why the Swedish economy did so well after what he sees as a policy mistake by the central bank. Although he has the benefit of being an insider, he tells us little about the internal dynamics of the Riksbank’s policy committee. His arguments seem convincing to a U.S. journalist, but apparently they were not to his colleagues. Why not? And what about the obvious and very public tensions within the FOMC? Are they constructive or not? Chairman Bernanke has said that he welcomes debate. Fielding questions in a recent town-hall videoconference with educators, he quipped that if two people agree all the time, one of them is redundant.⁵ But to a degree that Svensson’s paper does not contemplate, it is far from clear that everyone on the FOMC shares the Bernanke-Svensson framework for making monetary policy decisions. All of this raises a question about which Alan Blinder has written: is a committee of monetary policymakers better than a single governor? The Bank of England and the Bank of Japan have moved from an individual governor to a group. In Israel, Stanley Fischer is now the sole governor, but he is presiding over a transition to a monetary policy committee. From experiments in which students are confronted with monetary policy decisions as individuals and in groups, Blinder and John Morgan (2005) find that groups reach better decisions and reach them no more slowly than individuals, where slowness is measured not in time but in the amount of information required before making a move. Their bottom line is unequivocal:

Do groups make better decisions than individuals? The experimental answer seems to be yes. And the margin of superiority of group over individual deci-

5. Leslie Kwoh, “Bernanke Tells Teachers They Play a Role in Shaping U.S. Economy.” *The Star-Ledger* (Newark, N.J.), October 1, 2010.

sions is astonishingly similar in the two experiments. . . . If groups make better decisions and require no more information to do so, then two heads—or, in this case, five—are indeed better than one. Society is, in that case, wise to assign many important decisions, like monetary policy, to committees. (Blinder and Morgan 2005, p. 810)

I cannot quarrel with the results of Blinder's experiments, but I am not sure that his conclusion about the speed of decisionmaking is supported by recent Federal Reserve history. At several points over the past 4 years, Bernanke appears to have delayed action because of disagreement among policymakers over whether there was enough evidence to make another move. It is sometimes argued that committees are less likely to make very big mistakes. But what applies in normal times may not apply at all times: if one believes that the extraordinary economic circumstances of the past 4 years call for quick and sometimes courageous decisions to attempt unconventional monetary policy, then is a committee really better than a monetary commander-in-chief?⁶

Perhaps, as Svensson has suggested to me privately, the issue is not that the Riksbank has a committee, but that too few of the committee members have backgrounds as professional academics in subjects relevant to monetary policy. Of the six Riksbank governors, four hold Ph.D. degrees in economics. But only Svensson and Karolina Ekholm are academics by profession—and theirs were the only two dissents in the Riksbank decision that Svensson criticizes. At the Federal Reserve in June 2010, 11 of the 17 participants at the FOMC meeting were Ph.D. economists. Depending on how one counts, however, only four or five were professional academics. To a degree that Svensson's paper does not contemplate, it is far from clear that all the economists on the FOMC—even the academics—share the framework he describes and embraces. Although Bernanke himself does, some other members do not, as their dissents in recent FOMC meetings show.

Of course, having a single governor is a great idea—as long as it is the right person. I am sure Lars Svensson would find less to criticize about the Riksbank if the sole governor were Lars Svensson, and I suspect he would be even happier with Federal Reserve policy if the sole governor were Ben Bernanke.

6. For more on Federal Reserve decisionmaking during the financial crisis of 2008–09, see Wessel (2010).

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GENERAL DISCUSSION For Frederic Mishkin, Svensson's paper raised once again the issue of whether asset prices should be a concern of monetary policy. Whereas Svensson took the view that central banks should not worry about asset prices, Mishkin felt that they should, but only to the extent that they influence the availability of credit. Asset prices are not important in themselves, he argued, but they become important when they affect the things that monetary policymakers are expected to care about, such as inflation and output. The problem is that when excesses in asset markets unravel, the effects on credit can be non-linear, making them difficult for monetary policy to overcome. That was what had happened in 2008 in the United States. In contrast, nothing in the Swedish case indicated that there had been an excessive credit boom before the crisis.

Mishkin also noted that some observers—including one recently retired member of the Federal Open Market Committee, Thomas Hoenig—were now criticizing the Federal Reserve for committing to keep the policy interest rate at zero for so long, on the grounds that such a policy breeds excess risk taking in asset markets. Although that likely did happen in the run-up to the crisis, the situation today, Mishkin maintained, is very different. Again, the issue is not whether interest rates are too high or too low in some absolute sense, but whether a credit bubble is developing, and in fact the economy at present is deleveraging rather than adding leverage.

Finally, although Mishkin agreed with Svensson and with David Wessel that further U.S. monetary expansion, beyond the lowering of interest rates, had been called for in 2010, he was dissatisfied with how QE2 had been

executed. It had been done in quite discretionary fashion, whereas Mishkin believed the Federal Reserve should have articulated a simple and transparent framework explaining how it was consistent with long-run objectives. By implementing QE2 without an explicit framework, the Federal Reserve risked appearing to be simply accommodating bad fiscal policy. If markets came to believe that the Fed might continue to operate in such a discretionary, accommodative fashion, the result could be an increase in inflation expectations. The lack of a clear framework was also, in Mishkin's view, partly responsible for some of the frightening recent political attacks on the Federal Reserve.

Refet Gürkaynak, citing a paper from a decade ago by two of Svensson's fellow Swedes, Tore Ellingsen and Ulf Söderström, offered what he saw as a relevant distinction: when a central bank sends a signal that surprises the markets, that signal can be either about a change in the central bank's economic outlook, or about a change in the central bank's own preferences. The distinction matters, Gürkaynak argued, because one is always credible about one's own preferences but not necessarily about one's forecasting. Had the markets viewed the Riksbank's tightening in 2010 as revealing a change in its preferences toward lower inflation, they would have followed suit, market interest rates would have been higher, and the outcome would have been worse than it was. Instead, precisely because the Riksbank had so transparently communicated the logic behind its move, the markets saw that it was making a statement not about its preferences but about its outlook. The markets disagreed with that outlook, and therefore they did not follow the Riksbank in keeping interest rates high. Moreover, precisely because the markets had a good opinion of the Riksbank's competence, they believed that it would eventually converge to the correct policy path. That belief also contributed to the favorable outcome.

Ricardo Reis offered an alternative hypothesis about the markets' response: the Riksbank's announcement was about the future course of short-term interest rates, whereas the market response that suggested a lack of credibility was at the long end of the yield curve. Long-term rates in the market were too low, Svensson was arguing, to be consistent with the Riksbank's projection of short-term rates. But it might instead be, Reis suggested, that the mechanism being used to link short-term with long-term rates—namely, the expectations hypothesis of the term structure—was getting things wrong. And indeed, Reis claimed, most of the literature massively rejects the expectations hypothesis. Thus, it might be that the liquidity premium shifted in the right direction just as the Riksbank was implementing its policy change. Or, given the problems then emerging in

other European countries, there might well have been a flight to quality toward Sweden that contributed to pushing long-term rates down.

Lars Svensson replied that, in his view, what matters in the end is the actual term structure of interest rates, not whether it results from expectations of future short-term rates or from changes in risk or liquidity premiums. In any case, shifts in these premiums could not explain the enormous gap that had emerged. He thought the best explanation for why market participants did not believe the Riksbank was that they had a different view about future interest rates in countries outside of Sweden. The Riksbank believed that policy rates in other countries would rise, and therefore it could raise rates domestically without affecting the exchange rate. The markets apparently were predicting a lower path for foreign interest rates, and therefore they expected that if the Riksbank kept rates high, the krona would appreciate, and the Riksbank would then see its mistake and lower the policy rate.

Thomas Philippon added that it was possible that the markets did accept the Riksbank's mean projected path but viewed the downside risk to that projection as very high. He thought that that consideration could account for 80 basis points of the difference in rates or even more.

David Romer expressed the hope that the revised paper would address the question, which Wessel had raised, of why Svensson did not conclude that the Federal Reserve should have done more easing in 2010. The paper as written seemed to argue that two plus two equals five: it interpreted the Fed's June 2010 forecast as saying that under appropriate monetary policy, macroeconomic outcomes would be inconsistent with appropriate monetary policy. Svensson's framework seemed to lead naturally to the view that the Federal Reserve should have been more aggressive, and Romer wondered why Svensson did not explicitly say so. Mishkin added that in a situation like the present, where conventional policy has been exhausted and nonconventional policy has to be used, the available tools are more complex and carry a lot of extra baggage. Policymakers then have to worry about additional factors that they could ignore when the policy interest rate was above zero, and that introduced some doubt about whether further action was needed.

Robert Gordon said he had not yet heard a good explanation for why monetary policy in the United States had been "unlucky." What were the drags on the economy that had made the recession and its aftermath so much worse than had been forecast a year and a half before? He thought the best approach to the question was to contrast the recent U.S. experience with that in the other deep postwar recession, that of 1981–82. In the earlier

episode, the economy was fundamentally strong but had been deliberately strangled by Paul Volcker's Federal Reserve in an effort to wring out inflation. Thus, when the Fed finally relaxed its grip, the economy sprang back like a rubber band, recording five straight quarters of over 7 percent annualized real GDP growth. In contrast, the economy today is laboring under a double hangover from the housing bubble, with an excess supply of both residential and nonresidential construction together with high consumer and government indebtedness. Under those circumstances monetary policy is almost powerless: the IS curve has become essentially vertical, as evidenced by the fact that annual interest rates on 10-year government bonds have varied over a considerable range yet have had virtually no impact, positive or negative, on the real economy. Sweden, on the other hand, is not burdened by the double hangover and is experiencing a very different kind of recovery based on different factors.

Alan Blinder noted that the paper advertised itself as being about "practical" monetary policy, which to Blinder was an acknowledgment that monetary policy is not about theoretical blacks and whites, but rather about better versus worse, and about rules but also exceptions to those rules. With that in mind, he raised three questions, whose common thread was that each asked what exactly was the rule and what was the exception.

The first question involved the central bank's mandate: Blinder believed that, as a rule, the mandate does matter, but his takeaway from the paper was that the recent Swedish experience was an exception to this rule. Sweden is formally a single-mandate, inflation-targeting country, yet Svensson had argued that in this episode it had behaved exactly as if it had a dual mandate like that of the Federal Reserve. Did Svensson agree that the Riksbank's behavior was an exception to the rule in this regard?

The second question was one that others had raised, namely, Why did the Riksbank's transparent announcement of its likely future policy path lack credibility with the markets? The experience of other central banks, such as New Zealand and Norway, and Sweden itself in the past, suggested that such announcements are credible and that the markets quickly snap to. Again, should one regard those instances as the rule and the recent episode in Sweden as the exception?

Blinder's third question concerned uncertainty about the multiplier. It was widely agreed, he thought, that the "Brainard theorem"—that multiplier uncertainty leads to greater central bank conservatism—does not hold as an absolute precept. The literature, however, seemed to indicate that it does hold as a general rule, again subject to exceptions. Did Svensson and the other panelists agree?

For Benjamin Friedman, one of the paper's many nuggets of wisdom was the observation that central banks can operate with negative capital. Mishkin had spoken of the "baggage" that unconventional monetary policy carries, and one of the heavier pieces of that baggage is the potential exposure of the central bank's balance sheet to capital losses. Yet Svensson had argued, correctly in Friedman's view, that such losses are of no consequence as long as the cash flow from seigniorage exceeds operating expenses.

Friedman also saw the policy debate in Sweden, as recounted by Svensson, as one manifestation of a huge step backward in the empirical rigor with which monetary policy is discussed, not just in Sweden but elsewhere. In the distant past, it had been commonplace for central bankers to justify their actions by all kinds of vague and unsupported arguments—about inflation expectations, exchange rates, business confidence, and so forth—but in Friedman's view some discipline had been imposed in the last few decades, and the discourse had become much more scientific. In the recent debate, however, people seemed unembarrassed about making completely unanchored and unanchorable statements—for example, regarding the effect of asset purchases on inflation expectations—and this seemed to Friedman to mark a reversion to old ways.

Michael Woodford offered an alternative reason for the failure of the Riksbank's announcement to move markets, namely, that the announcement was framed as a prediction about interest rates and did not set a specific policy target or anything else that would indicate a deep policy commitment. The announcement might have had a stronger effect had it at least laid out the specific macroeconomic conditions that in the Riksbank's view would or would not justify raising interest rates. As an example, Chicago Federal Reserve Bank President Charles Evans had recently said that it would be useful to commit to not raising the policy rate as long as inflation was not above 3 percent and unemployment not below 7½ percent.

Justin Wolfers proposed, not entirely facetiously, that voting by monetary policy committees be conducted on an accuracy-weighted basis, with votes by members with a good track record of past predictions given greater weight. He interpreted Svensson's paper as reinforcing the need for a sound intellectual framework in monetary policy, and indeed as a plea to those who believe in such frameworks over ad hocery to stand and support him. Finally, Wolfers saw the paper as an existence proof that central banks do make mistakes, and he saw potential value in a research program that examined the behavioral, sociological, and organizational reasons for those mistakes. Such research might need to be undertaken

outside the usual confines of economics departments, but the findings could be enlightening.

John Quiggin proposed that a destabilizing of inflation expectations might not necessarily be a bad thing. If one assumes that policymakers in 2007 had the right inflation target based on information available at the time, the record since then suggests that the benefits, in terms of macroeconomic stability, are less than had been thought. Indeed, in Quiggin's view, recent evidence seemed to support the notion that low inflation contributes to the risk of financial crisis, and that the costs of keeping inflation low are higher than had been thought. On balance, the evidence suggested that central banks today should be revising their target inflation rates significantly upward.

Gregory Mankiw suggested that the paper said more about the strength of Svensson's prior about the validity of his framework than about the framework itself. As Svensson himself had documented, the outcome in Sweden had been good even though policy, in terms of the framework, had been bad, and vice versa in the United States, yet none of this seemed to have dented Svensson's conviction that his framework was correct. Mankiw wondered whether this experience had had any impact on policy deliberations within the Riksbank. Did Svensson find that his framework had been at all compromised, making his colleagues more resistant to his arguments based on that framework?

Responding to the discussion, Lars Svensson regretted that he would not have the time to respond to all the interesting comments. He began by noting that the Riksbank's policy path had been quite credible from the beginning of the crisis through February 2009. Thereafter the markets brought about more contractionary conditions than the Riksbank would have wanted, but more recently they have implemented a welcome easing. On balance, Svensson felt that the circumstances of the crisis period were so special that one cannot draw any firm conclusions about the credibility of policy. As he had stated earlier, he thought the best explanation for the apparent lack of policy credibility was that the market had expected foreign interest rates to be low and that the Riksbank would eventually have little choice but to allow domestic rates to be low as well. Given that Svensson was strongly in favor of central banks publishing their policy rate forecasts, what worried Svensson most about this episode was that it might discourage other central banks from making their policy rate paths public in the future, for fear of again being contradicted by the markets.

On the question of single versus dual mandates, Svensson did not share the view that the European Central Bank is a strict inflation targeter—in its

actual policy over the years, it seems that the ECB does take the state of the real economy into account. The terms of the ECB's mandate are somewhat open to interpretation, and different ECB boards and different ECB chairmen may interpret them in different ways. In the end, although a precisely formulated mandate is surely a good thing, in its absence central bankers themselves can articulate a precise and clear interpretation of their mandate that market practitioners can then rely on. The Riksbank has clearly stated that it interprets its mandate such that the Riksbank, in addition to stabilizing inflation around the inflation target, is also striving to stabilize production and employment around long-term sustainable paths.

Responding to Romer, Svensson clarified that although he did believe the Federal Reserve had done the right thing by initiating a period of policy easing in the summer of 2010, he had not attempted to judge whether it had eased too much or too little. Given that the zero lower bound on interest rates was by then binding, such easing had to be implemented through nonconventional means, and it was understandable that the Federal Reserve needed some time to build internal consensus before going ahead with QE2. In any case, it had managed to achieve some effective easing through rhetoric alone in the meantime. It was important, in his opinion, that the Federal Reserve moved in the right direction.

Regarding the governance of monetary policymaking, Svensson felt that a committee, despite some shortcomings, dissipated the risk of placing the responsibility on a single fallible individual. Of course, the more experience and knowledge of monetary policy the appointees bring to the position, the better, and it would not be a bad thing in his view if more people with academic or research background were brought on board than the two who currently sit on the Riksbank committee. Svensson thought it prudent to demur on all questions regarding internal committee dynamics, but he acknowledged that personalities played a role and that there might be something of a cultural clash between those with an academic or research background and those with a bureaucratic background. He agreed with Wolfers that a fascinating paper could be written on the dynamics of monetary policymaking from a behavioral economics perspective, but lacking training as a behavioral economist himself, he invited Wolfers to take on such a project.