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An Update on the Foreign Experience with Explicit Numerical Price Objectives¹

I. Introduction and summary

This note compares the experience over the past two years of three major economies that have explicit numerical inflation objectives—the euro area, the United Kingdom, and Canada—with the experience of the United States, to assess how explicit inflation objectives might have influenced the conduct of monetary policy. This work is an update of our earlier studies done for the FOMC on the foreign experience with explicit numerical inflation objectives.²

We consider two questions. First, has the existence of an explicit numerical price objective (ENPO) been associated with more solidly anchored expectations for long-run inflation? On the one hand, we find that recently published research on this topic tends to support the view that expectations are better anchored in economies with ENPOs. On the other hand, however, we find little evidence that inflation expectations were better anchored in the ENPO economies than in the United States during the recent period of surging commodity prices. Survey measures of expectations of long-run inflation over the past two years have been relatively stable in Canada, the euro area, and the United States, but rose some in the United Kingdom. Market-based measures of inflation expectations in the United States generally rose about the same as or less than those in the other economies.

The second question we consider is how the existence of an ENPO might have influenced the conduct of monetary policy over the past two years. In principle, a credible inflation objective ought to provide a central bank greater scope to pursue other objectives, such as full employment or financial stability, at less cost to its price stability goal. This flexibility should have been particularly valuable in the past two years, when monetary policymakers faced potentially conflicting needs to counter inflationary pressures and to support output growth and the financial system. However, during this period, the ENPO central banks eased monetary policy by considerably less than the Federal Reserve did. We explore a number of reasons that might explain this difference in policy actions between the ENPO central banks and the Federal Reserve, including the possibility that ENPO central banks during this period had higher weights on their inflation objectives, that the ENPOs imposed constraints on the abilities of the central banks to pursue goals other than price stability, and that the central banks had different views of the shocks they were experiencing and the effects of those shocks on their economies. Given the

¹ This note incorporates comments from Christopher Erceg, Steven Kamin, David Lebow, Andrew Levin, Brian Madigan, John Roberts, Nathan Sheets, and David Stockton. The note also benefited from discussions with ^{552 U.S.C. (b)(6)} of the Bank of England, ^{552 U.S.C. (b)(6)} of the Bank of Canada, and ^{552 U.S.C. (b)(6)} of the European Central Bank.

² See “The Foreign Experience with Explicit Numerical Price Objectives,” January 19, 2005, “Update on the Explicit Numerical Price Objective Project,” October 12, 2006, and “Foreign Experience with the Formulation and Discussion of Inflation Objectives,” March 8, 2007.

possible alternative explanations, we cannot determine conclusively the extent to which ENPOs were important factors in the conduct of monetary policy over this period, although it does not appear that the ENPOs conveyed substantially more flexibility to respond to economic conditions.

II. Long-run inflation expectations

A. Recent literature

In previous background notes to the Committee, we reviewed relevant research on the stability of long-run inflation expectations and found that the weight of the evidence appeared to favor the view that long-term inflation expectations in economies with numerical price objectives may be somewhat better anchored than in those without one. In particular, several studies showed that long-term inflation compensation did not respond significantly to economic news in inflation targeting countries, an interpretation consistent with well-anchored inflation expectations.³

Since we last reviewed this issue in October 2006, some further evidence has accumulated in favor of the view that economies with numerical price objectives may have better anchored expectations. Beechey et al. (2007) show that although mean or median forecasts of long-run inflation are reasonably well anchored in both the United States and the euro area, the individual forecasts are more dispersed in the United States. Figure 1a plots means and medians of long-run inflation expectations in the euro area and in the United States, based on surveys of professional forecasters. Long-run expectations for the euro area remain quite constant over time, with only slight and temporary deviations from the inflation goal of the European Central Bank (ECB), which is stated as “below, but close to, 2 percent.” In the United States, inflation expectations, as measured by the mean or median forecast in the Survey of Professional Forecasters, are also relatively smooth at around 2½ percent for consumer price index (CPI) inflation, although those in other surveys fluctuate somewhat more. However, as shown in figure 1b, the standard deviation of U.S. inflation forecasts at each survey date is higher than the standard deviation of corresponding euro-area inflation forecasts. Moreover, the cross-sectional dispersion of forecasts in the euro area has moved down over the sample, while those for the United States have not.⁴

Similarly, as shown in figure 2, Gürkaynak et al. (2008) provide evidence that long-run inflation expectations are more tightly clustered for the United Kingdom (blue), as compared with the United States (red), by looking at the distribution of professional forecasters’ medium-to-long-range inflation projections.⁵ This tighter distribution was maintained even when the inflation target of the Bank of England was switched from a 2½ percent target for RPIX inflation to a 2 percent target for the CPI in late 2003.⁶ The bulk of the distribution of inflation

³ These papers include Gürkaynak et al. (2005), Gürkaynak et al. (2006), and Gürkaynak et al. (2008). See Swanson (2006) for a survey of this literature.

⁴ Figure 1b is an updated version of one in Beechey et al. (2007). This figure, which includes surveys through November 2008, was included in the December 2008 FOMC background memo, “Communication and Commitment Strategies at Very Low Interest Rates,” by Christopher Erceg, Michael Kiley, and Andrew Levin.

⁵ This figure is an update of one from Gürkaynak et al. (2008). The figure is taken from Mishkin (2008).

⁶ Brown (2003) and King (2004) provide the rationale behind the change.

expectations shifted from being predominantly close to the earlier target (e.g., shown in 2001:Q4) to being very close to the new target (e.g., shown in 2004:Q4), and the distribution remained relatively closely clustered near that rate in 2008:Q2.

B. Recent performance

Figure 3 plots the evolution of surveys of long-run inflation expectations from Consensus Economics for all of the economies covered in this note. As noted in the previous background papers, expectations were remarkably stable in Canada starting around 2000. They have remained so, even in the period up until mid-2008 when oil and other commodity prices ran up sharply and current rates of headline inflation rose markedly. Expectations in the euro area (in the bottom panel) have also been quite stable, as noted above. However, expectations in the United Kingdom—both the current CPI measure of inflation and the older RPI measure of inflation—have moved up somewhat since 2007. Expectations in the United States have drifted down to just above 2 percent.

Market-based measures of inflation expectations, such as measures derived from breakeven rates of inflation or inflation swaps (figures 3a and 3b), are considerably more variable, particularly in 2008. Importantly, over the past two years, measures of inflation expectations generally appear to have risen about the same or less in the United States than in the economies with ENPOs. This comparison is notable in a period of rising inflation and when monetary policy was significantly looser in the United States (see figure 4).

More recently, the sharp decline in the measures was likely influenced by the ongoing market turmoil. For example, in the case of 10-year breakeven inflation, the demand for the safety of nominal government bonds has driven down yields and because it has not been mirrored in the rates on inflation-protected bonds, estimated breakeven rates have declined sharply. This effect may explain, in particular, the larger drop in U.S. breakeven inflation.

III. **The conduct of monetary policy**

From mid-2007 to mid-2008, when inflationary pressures were high and prospects for output growth were deteriorating, the Federal Reserve reduced the target for the federal funds rate much more aggressively than the major central banks with ENPOs reduced their key policy rates. We attempt to identify possible reasons for this difference in policy response in the first subsection below.

We also briefly consider the behavior of monetary policy in these economies during the last three months of 2008, when prospects for inflation declined dramatically. During that period, the policy rate responses of the central banks with ENPOs and the Federal Reserve tended to converge, as any tradeoff among inflation, output, and financial stability objectives disappeared.

A. July 2007 to September 2008

Between July 2007 and April 2008, the monetary policy responses of foreign central banks were considerably more modest than those of the Federal Reserve (see figure 4). While the Federal Reserve cut the target for the federal funds rate $3\frac{1}{4}$ percentage points between July

2007 and April 2008, the Bank of Canada reduced its target for the overnight rate 1½ percentage points, the Bank of England cut its Bank Rate ¾ percentage point, and the ECB left its main refinancing rate unchanged. During the next five months, from May 2008 to September 2008, policy rates were left on hold at most of these central banks, as inflationary pressures intensified but prospects for output deteriorated. And the ECB, which was the exception, actually raised its main refinancing rate ¼ percentage point in July 2008.

Why did we see the ENPO central banks ease less than the Federal Reserve during this period? One possible explanation is that the ENPO central banks were relatively more cautious because they placed greater emphasis on meeting their inflation objectives. Notably, the mandates of the ECB and the Bank of England give clear priority to price stability, compared with the dual mandate of the Federal Reserve, and the mandate of the Bank of Canada arguably falls somewhere in between.⁷ Nonetheless, some researchers have concluded that the so-called “objective functions” of the ENPO central banks are broadly similar to the objective function of the Federal Reserve.⁸ However, the adoption of ENPOs is still relatively new in historical terms, and it may be the case that this recent episode of high inflationary pressures and slowing output introduced a context in which the policy choice could reveal that these central banks actually place a higher weight on inflation. It is also possible that by publicly specifying a numerical inflation objective or by having a mandate that stresses price stability over other objectives, the ENPO central banks have increased their emphasis on inflation over time.

A second possible explanation is that, even if the Federal Reserve and the ENPO central banks have similar preferences about their objectives, the ENPO central banks may have felt compelled to carry out tighter policies because of the public nature of their inflation targets, the quite elevated rates of current inflation, and the risk that inflation could rise further. Large deviations of current inflation from their inflation goals may have been seen as threatening the credibility of their medium-run inflation goals.

The minutes of the meetings of the Bank of England’s Monetary Policy Committee (MPC) during this period provide examples of policymaker concern over the credibility of the target. According to the minutes of the October 2007 meeting, some committee members expressed the concern that an unexpected cut in the Bank Rate might “be misinterpreted as a signal that monetary policy was focused on supporting the financial system and not on meeting the inflation target.”¹⁰ Later, at the January 2008 meeting, committee members argued that back-to-back reductions of the Bank Rate might “encourage observers to think that the Committee was focused more on stabilising demand than meeting the inflation target. . . .”¹¹ Such statements need not imply that policymakers felt constrained in their policy choices. It is possible that the

⁷ The Treaty Establishing the European Community set price stability as the primary objective of the ECB, and “without prejudice” to that objective, the ECB can also “support the general economic policies of the Community.” The Bank of England’s legal mandate is to deliver price stability and, subject to that, to support the Government’s economic objectives, including those for growth and employment. According to the latest joint statement by the Government and the Bank of Canada, the inflation target is the best way to support monetary policy’s “primary objective of . . . sustained economic growth, rising levels of employment and improved living standards.”

⁸ Goodhart (2005) contends that the Bank of England’s monetary policy is similar to that of the Federal Reserve. Smets and Wouters (2005) and Christiano, Motto, and Rostagno (2007) have shown that the Federal Reserve and the ECB place similar weights on inflation and output stabilization.

¹⁰ Bank of England (2007).

¹¹ Bank of England (2008).

committee members were merely revealing their commitment to the inflation goal and that they saw an easier policy stance as likely to send misleading signals about that commitment. It is worth noting that in recent discussions with senior policymakers from the Bank of England and the Bank of Canada, neither of them accepted the view that their policy choices were unduly constrained.

Yet another explanation is that the central banks had different views on the types and magnitudes of the shocks they were facing or on the effects of those shocks on their economies. Figures 5a and 5b, which plot the evolution of the forecasts of the FOMC, the Bank of England, and the ECB, offer some guidance on the extent to which such differences might have been present.¹²

For inflation, Federal Reserve forecasts lay consistently below those of the Bank of England, which may explain at least part of the differences in the pace of easing for those two central banks. More importantly, the inflation forecasts for 2009 of the ECB and Bank of England were considerably above their numerical inflation objectives until late in 2008. Indeed, in raising rates in July 2008, the ECB's Governing Council noted that its "decision was taken to prevent broadly based second-round effects and to counteract the increasing upside risks to price stability over the medium term."¹³ Both central banks were worried that inflation expectations might be moving up and that the prolonged period of elevated inflation could result in higher wage inflation.¹⁴

For output growth, policymakers at some of the foreign central banks believed that their economies would hold up better than that of the United States. The ECB justified its July hike, in part, because it believed that economic activity in the euro area and elsewhere outside the United States would remain resilient. This view was influenced by a belief that the euro area had "not been significantly affected by the [financial] tensions."¹⁵ Despite Canada's close economic linkages to the United States, the Bank of Canada forecast growth rates (not shown) of 3 percent or higher for 2009 through most of 2008, in line with the effects on Canada of the then-prevailing commodity price boom. This stronger outlook for growth reduced the perceived need for the Bank of Canada to ease monetary policy as vigorously as in the United States.

Even if central banks had similar outlooks, they may have had different assessments of the risks to this outlook. Central banks following a risk-based approach to monetary policy may have "taken out insurance" for the possibility of either much lower output or much higher inflation. During the first half of 2008, the ECB stressed the upside risks to inflation and worries

¹² Note that the forecasts that the ECB publishes are staff forecasts, which may or may not represent the views of the Governing Council. Also note that the forecasts are not directly comparable because of other conditioning assumptions, most notably the path of future monetary policy.

¹³ European Central Bank (2008).

¹⁴ Furthermore, as noted in the October 2006 memo (cited in footnote 2), ECB officials and, to a lesser extent, those at the Bank of England have downplayed the importance of core inflation. In particular the ECB has said that core inflation may be a poor predictor of headline inflation, as the former lags the latter.

¹⁵ European Central Bank (2008).

about inflation expectations. Figure 6 shows that the uncertainty of the Bank of England's forecasts of both inflation and output for 2009 rose over time.¹⁶

Finally, some central banks may have had differing views about the appropriate conduct of monetary policy.¹⁷ In particular, some ECB Board members said that the financial turmoil and its effects were best addressed by the liquidity provision facilities of the ECB. The adjustment of policy rates should then be devoted to the Bank's price stability objective, setting the policy rate at a level to help inflation be close to its goal in the medium term.¹⁸

As a result of the differences in what might have been happening across these economies, differences in policymakers' perceptions of what might have been happening, and differences in emphasis placed on inflation objectives, comparison with the Federal Reserve is not a clean test of whether the presence of an ENPO influenced the response of central banks to developments during this period. Thus, we cannot rule out the possibility that on the margin the foreign central banks adopted policy stances that were different from what they might otherwise have been, holding all else equal. Nevertheless, it does not appear that having an ENPO conveyed substantially more flexibility to respond to economic conditions.

B. October 2008 to December 2008

By October, policymakers became convinced that the risks to output and inflation had shifted substantially to the downside, and views on the next steps for monetary policy converged, with an internationally coordinated policy rate cut in early October followed by several other large reductions in policy rates by the Federal Reserve and the foreign central banks in subsequent months: The Bank of England slashed its Bank Rate 3 percentage points in the fourth quarter; the Federal Reserve reduced the target for the federal funds rate 1¾-2 percentage points; the ECB lowered its main refinancing rate 1¾ percentage points; and the Bank of Canada cut its target rate 1½ percentage point.¹⁹

¹⁶ The Bank of England describes the measure of uncertainty "as the 'input' standard deviation used in the construction of the distribution described by the fan chart.... It is equal to the actual standard deviation of the distribution only when the fan chart is symmetric." See Britton, Fisher, and Whitley (1998) for further details.

¹⁷ Related to this discussion, central banks have been debating for several years the proper response of monetary policy to asset price bubbles. Since 2004, a number of "inflation targeting" central banks, including the Bank of Canada, the Sveriges Riksbank, and the Norges Bank, have made the horizons at which they are to meet their inflation targets more flexible in certain circumstances. The argument is that some shocks, such as asset price shocks, are more persistent, and the central bank needs a longer timeframe over which to trade off the potentially competing objectives of inflation, output growth, and financial stability. This flexibility may allow them to engage in a strategy of "leaning against the wind" during an asset price bubble, where they would trade off less inflation and lower output growth in the near term against higher inflation and higher output growth (and more financial stability) at some point beyond their usual horizons for meeting their inflation targets. Other central banks with ENPOs take different approaches. The ECB has "two pillars" of monetary policy, where the second pillar focuses on monetary and credit developments. The Bank of Japan assesses monetary policy from "two perspectives," where the second perspective is looking at the longer-term risks. See the staff's background notes from October 2006 and March 2007 for more details on the nexus between monetary policy and asset prices.

¹⁸ See Bini Smaghi (2008).

¹⁹ The Bank of England cut a further 50 basis points on January 8. The ECB and Bank of Canada next meet on January 15 and January 20, respectively.

Policymakers at the Bank of Canada and the Bank of England expressed the view that inflation targeting has been helpful during this episode. The benefit, however, was not so much in having an explicit inflation objective as it was in having policy tied to an explicit forecast. It was felt that the publication of these forecasts helped to communicate the need for aggressive policy action very effectively once the inflation outlook changed dramatically.

References

- Bank of England (2007), Minutes of Monetary Policy Committee Meetings, October 3 and 4.
<http://www.bankofengland.co.uk/publications/minutes/mpc/pdf/2007/mpc0710.pdf>.
- (2008), Minutes of Monetary Policy Committee Meetings, January 9 and 10.
<http://www.bankofengland.co.uk/publications/minutes/mpc/pdf/2008/mpc0801.pdf>.
- Beechey, Meredith J., Benjamin K. Johannsen, and Andrew Levin (2007). "Are Long-Run Inflation Expectations Anchored More Firmly in the Euro Area than in the United States?" CEPR Discussion Paper 6536. London: Centre for Economic Policy Research, October, www.cepr.org/pubs/dps/DP6536.asp.
- Bini Smaghi, Lorenzo (2008), "Financial stability and monetary policy: Challenges in the current turmoil," a speech at a CEPS joint event with Harvard Law School on the EU-US financial system, New York, April 4.
<http://www.ecb.int/press/key/date/2008/html/sp080404.en.html>
- Britton, Erik, Paul Fisher, and John Whitley (1998), "The Inflation Report projections: understanding the fan chart," in the Bank of England's Quarterly Bulletin, February, 30-37. <http://www.bankofengland.co.uk/publications/quarterlybulletin/qb980101.pdf>
- Brown, Gordon (2003). "Remit for the Monetary Policy Committee of the Bank of England and the New Inflation Target," letter from the Chancellor of the Exchequer to the Governor of the Bank of England,
www.bankofengland.co.uk/monetarypolicy/pdf/chancellorletter031210.pdf, and accompanying annex, www.bankofengland.co.uk/monetarypolicy/pdf/annex031210.pdf.
- Christiano, Lawrence, Roberto Motto, and Massimo Rostagno (2007), "Shocks, Structures or Monetary Policies? The Euro Area and US after 2001," NBER Working Paper 13521. Cambridge, Mass.: National Bureau of Economic Research,
<http://papers.nber.org/papers/w13521>.
- European Central Bank (2008), "Editorial," in *Monthly Bulletin*, July, 5-8.
<http://www.ecb.int/pub/pdf/mobu/mb200807en.pdf>
- Goodhart, Charles A.E. (2005), "The Monetary Policy Committee's Reaction Function: An Exercise in Estimation," *Topics in Macroeconomics*, vol. 5 (no. 1), article 18.
- Gürkaynak, Refet S., Andrew T. Levin, Andrew N. Marder, and Eric T. Swanson (2006). "Inflation Targeting and the Anchoring of Inflation Expectations in the Western Hemisphere," in Frederic S. Mishkin and Klaus Schmidt-Hebbel, eds., *Inflation Targeting*. Santiago: Bank of Chile. <http://www.bcentral.cl/estudios/documentos-trabajo/pdf/dtbc400.pdf>

- Gürkaynak, Refet, Andrew T. Levin, and Eric T. Swanson (2008). "Does Inflation Targeting Anchor Long-Run Inflation Expectations? Evidence from Long-Term Bond Yields in the U.S., U.K., and Sweden." CEPR Discussion Paper #5808.
<http://www.cepr.org/Pubs/new-dps/dplist.asp?dpno=5808>
- Gürkaynak, Refet S., Brian Sack, and Eric T. Swanson (2005), "The Sensitivity of Long-Term Interest Rates to Economic News: Evidence and Implications for Macroeconomic Models," *American Economic Review* 95(1), 425-436.
- King, Mervyn (2004). Speech delivered at the annual Birmingham Forward/CBI Business Luncheon, Aston Villa Football Club, Birmingham, United Kingdom, January 20, www.bankofengland.co.uk/publications/speeches/2004/speech211.pdf.
- Mishkin, Frederic S. (2008), "Whither Federal Reserve Communication," a speech given to the Petersen Institute for International Economics, Washington, DC., July 28.
<http://www.federalreserve.gov/newsevents/speech/mishkin20080728a.htm>
- Office for Official Publications of the European Communities (1992), "Protocol on the Statute of the European System of Central Banks and of the European Central Bank," *Official Journal of the European Communities*, Series C, No. 191, 68-79.
http://www.ecb.int/ecb/legal/pdf/en_protocol_18.pdf
- Smets, Frank, and Raf Wouters (2005), "Comparing Shocks and Frictions in US and Euro Area Business Cycles: A Bayesian DSGE Approach," *Journal of Applied Econometrics*, vol. 20 (no. 2, Recent Developments in Business Cycle Analysis), 161-83.
- Swanson, Eric T. (2006), "Would an Inflation Target Help Anchor U.S. Inflation Expectations?" *Federal Reserve Bank of San Francisco Economic Letter*, 2006-20, August 11. <http://www.frbsf.org/publications/economics/letter/2006/el2006-20.html>

Figure 1a

Long-Run Inflation Expectations of Professional Forecasters

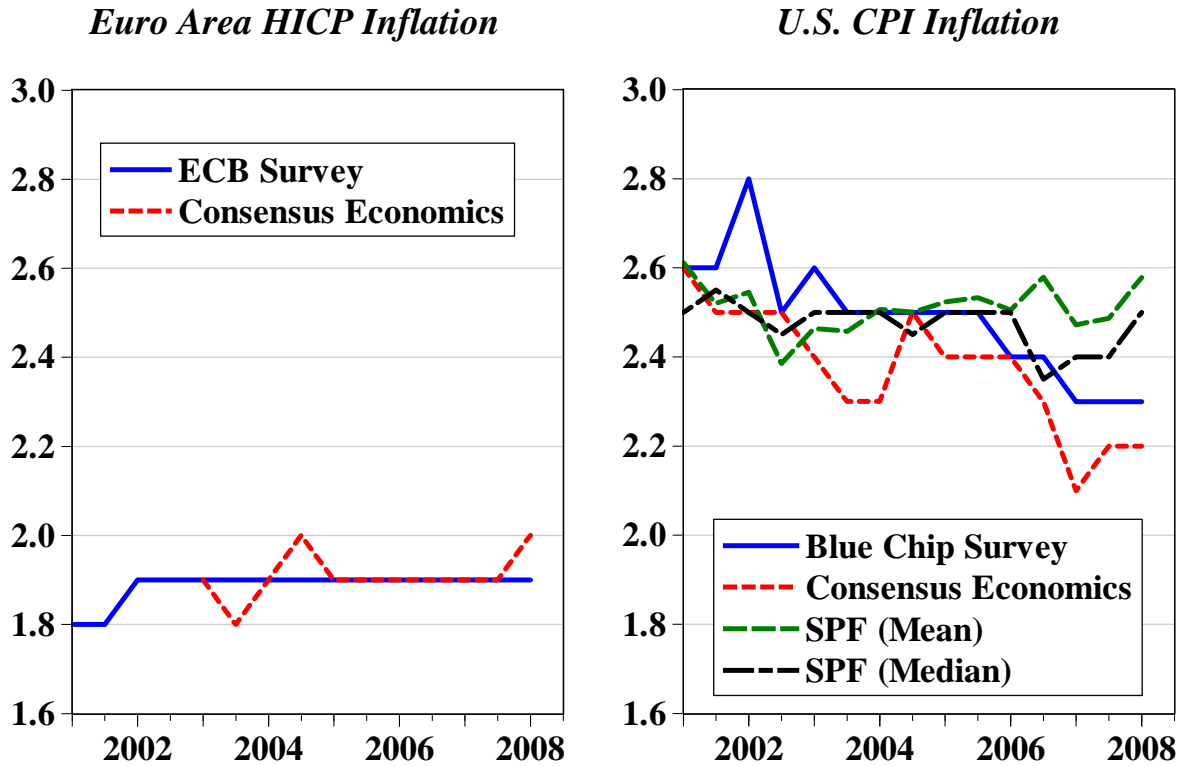


Figure 1b

Cross-Sectional Dispersion in Long-Run Inflation Expectations

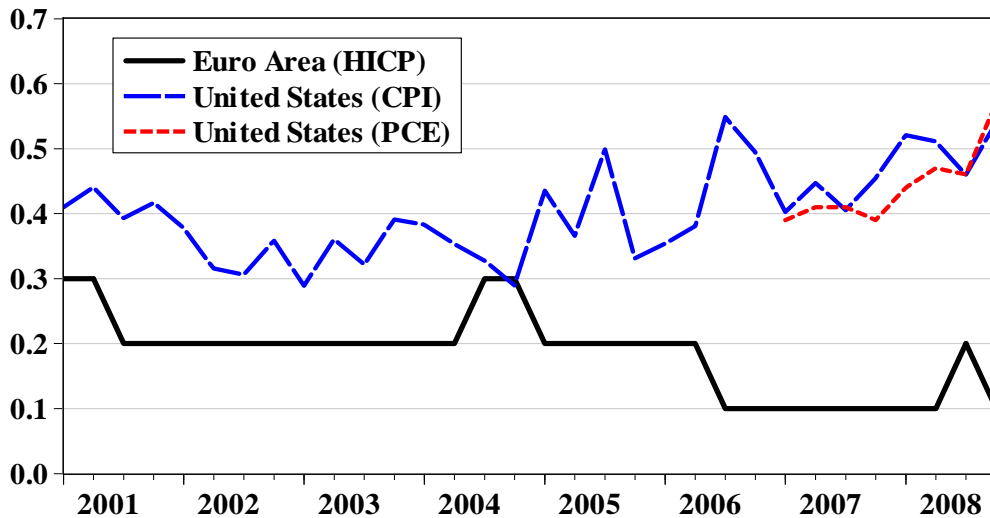


Figure 2

**Comparing Medium-to-Long-Run Inflation Expectations
in the United Kingdom and the United States**

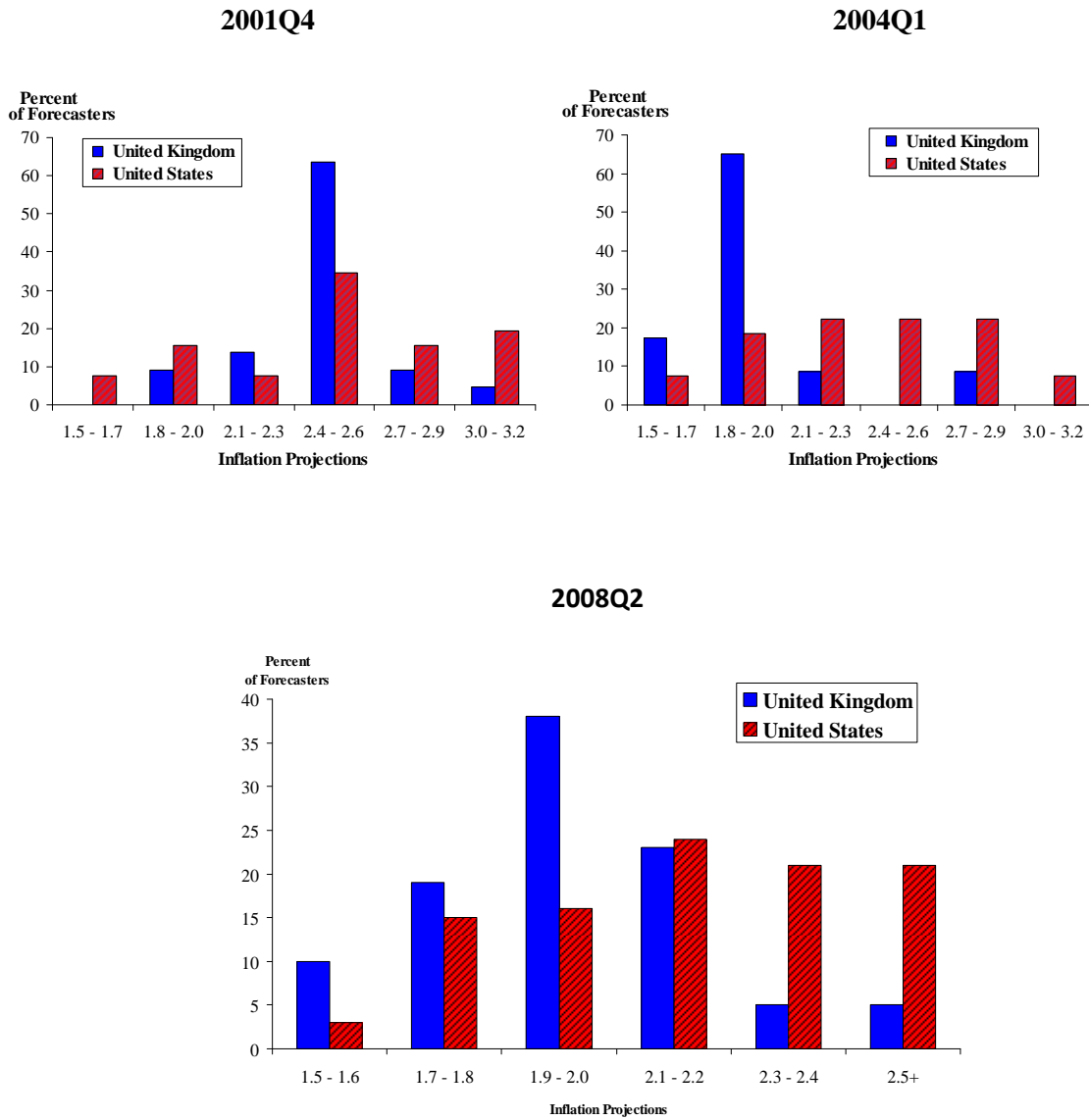
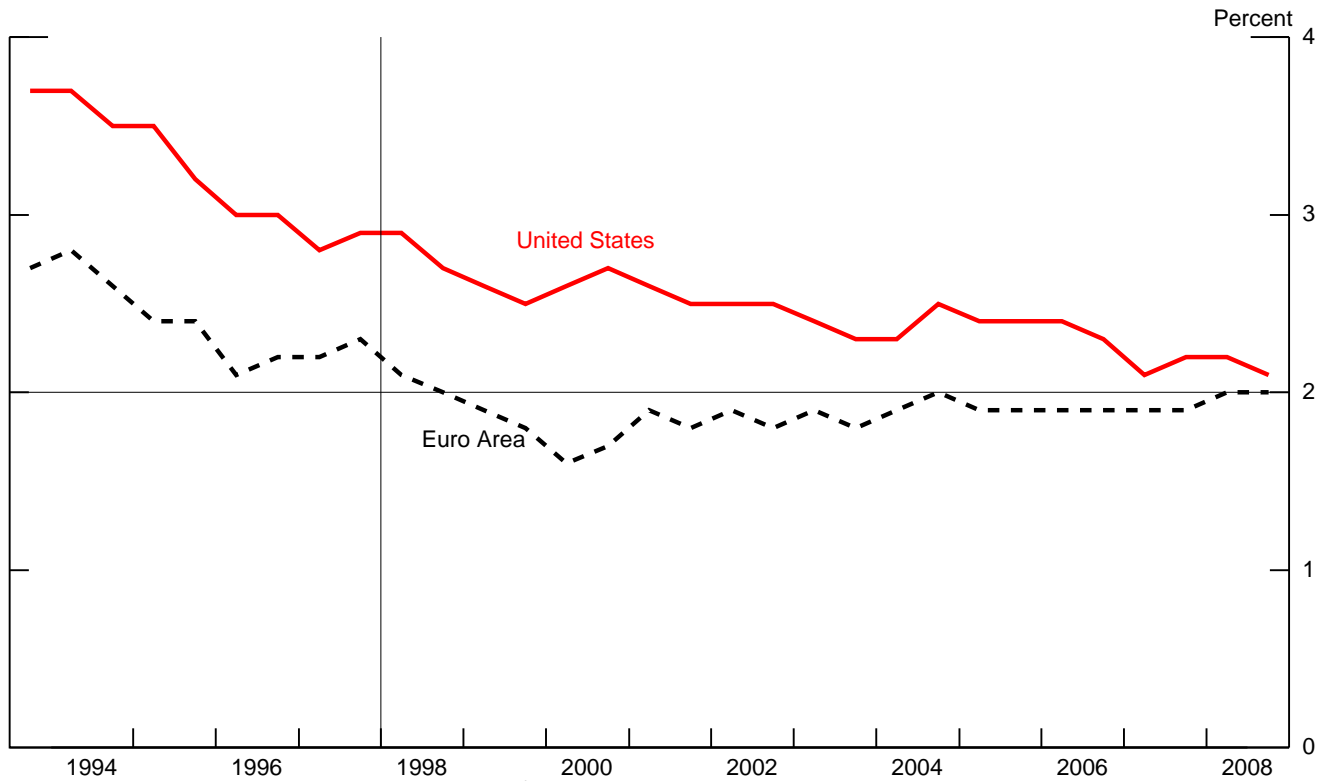
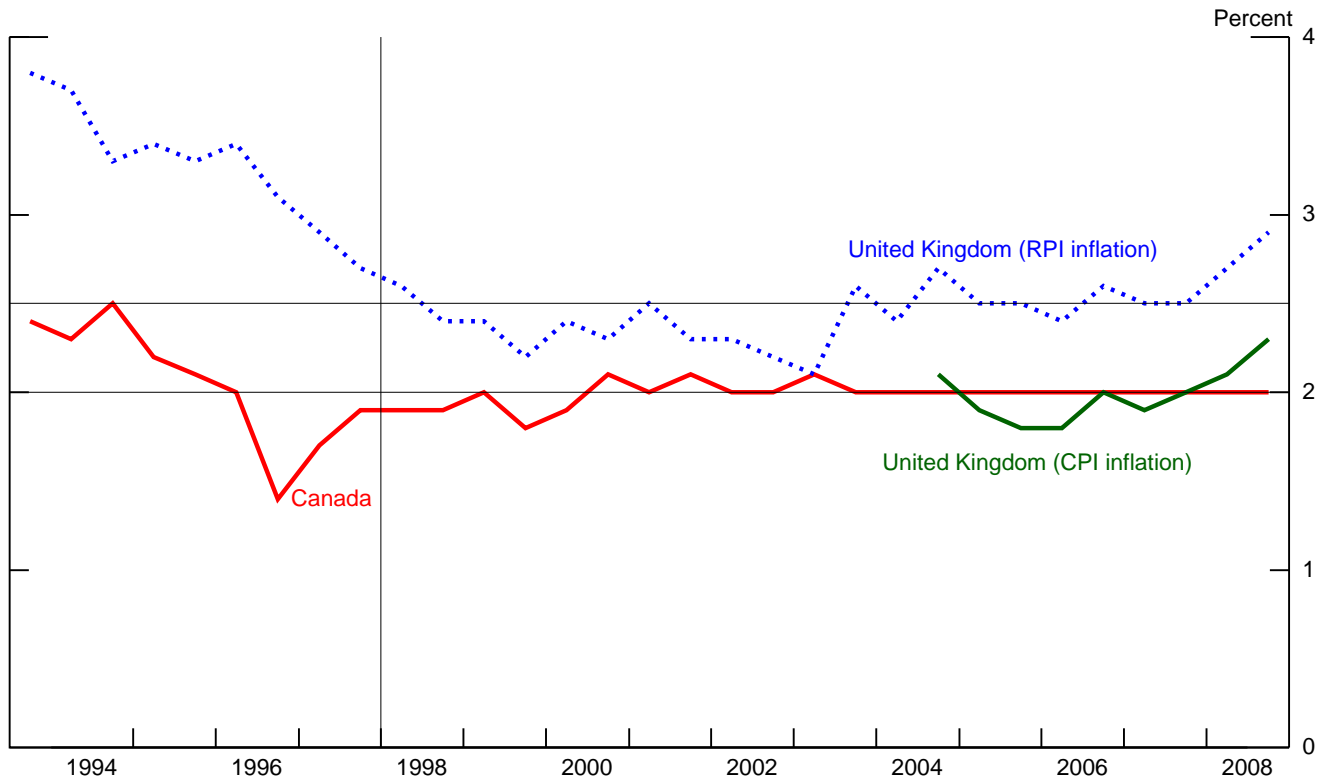


Figure 3

Survey of Long-Term Inflation Expectations*



*Notes: Expectations come from surveys, conducted by Consensus Economics, that ask for forecasts of inflation 6-to-10 years ahead. The surveys are reported in April and October of each year. Before 2003, euro-area expectations are expectations of German CPI inflation.

Figure 3a

Long-term Breakeven Inflation Rates

(Nominal minus Index Bond Yields, Monthly)

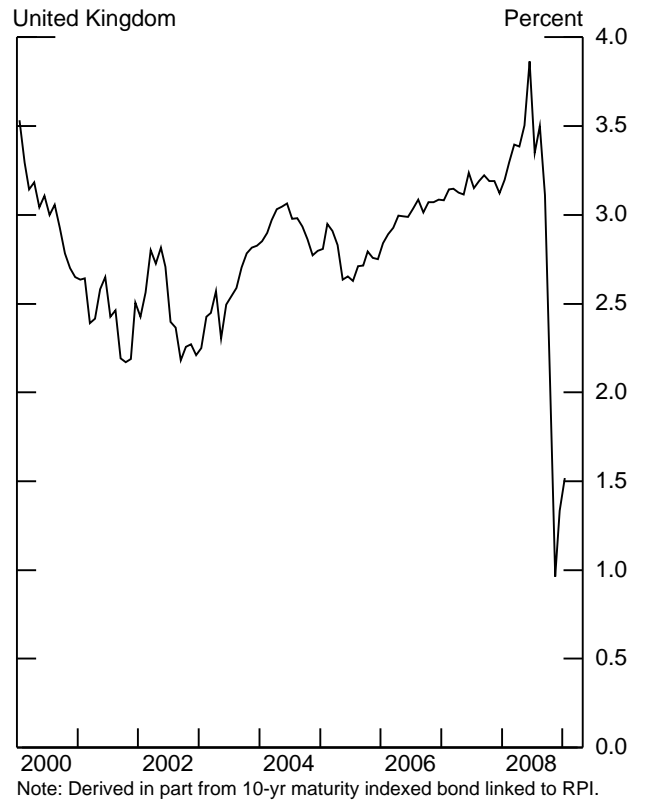
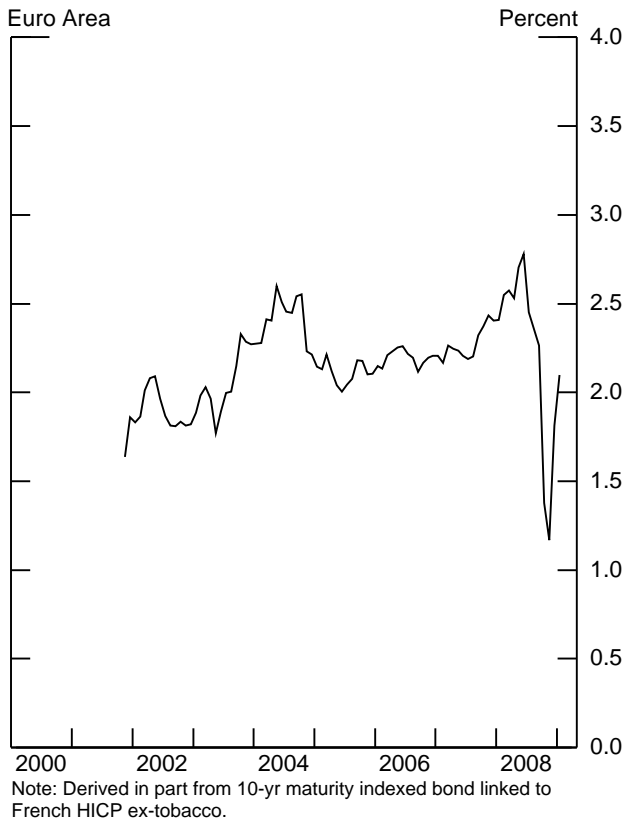
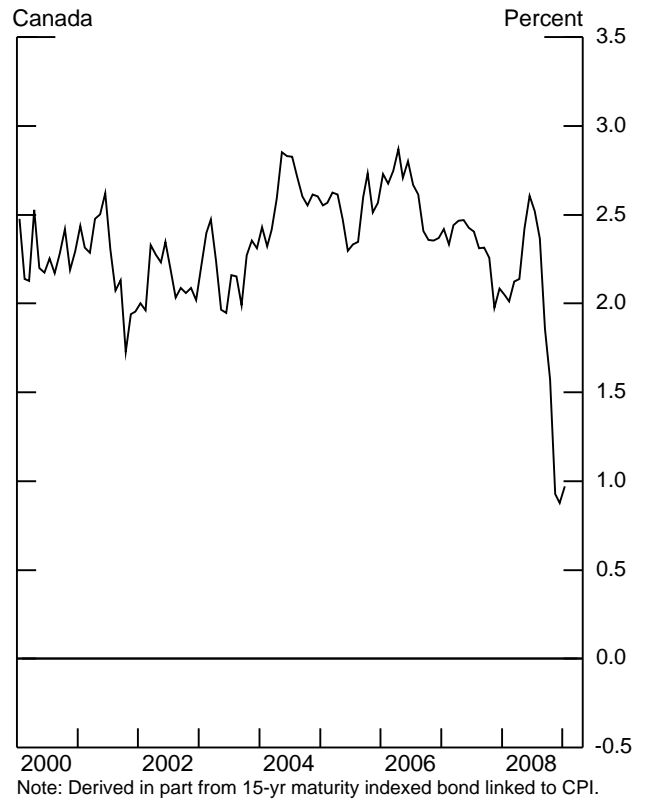
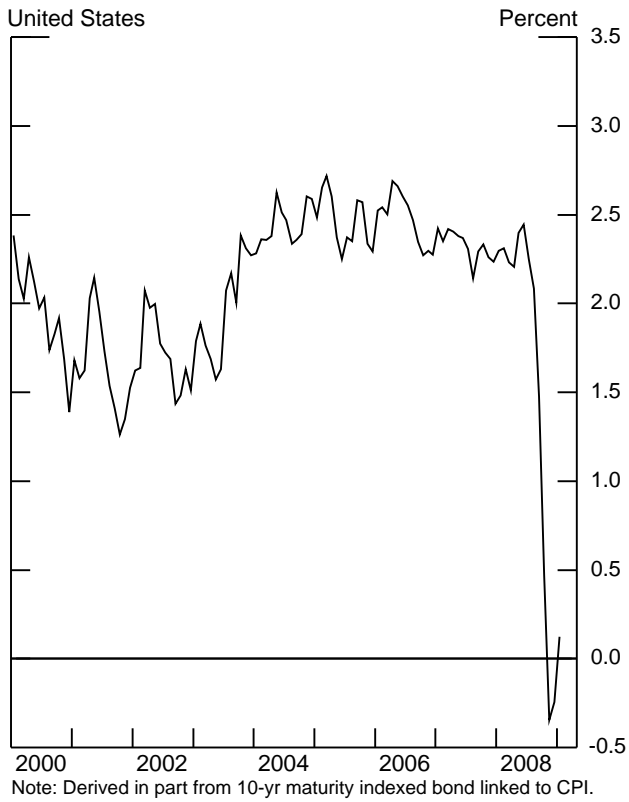
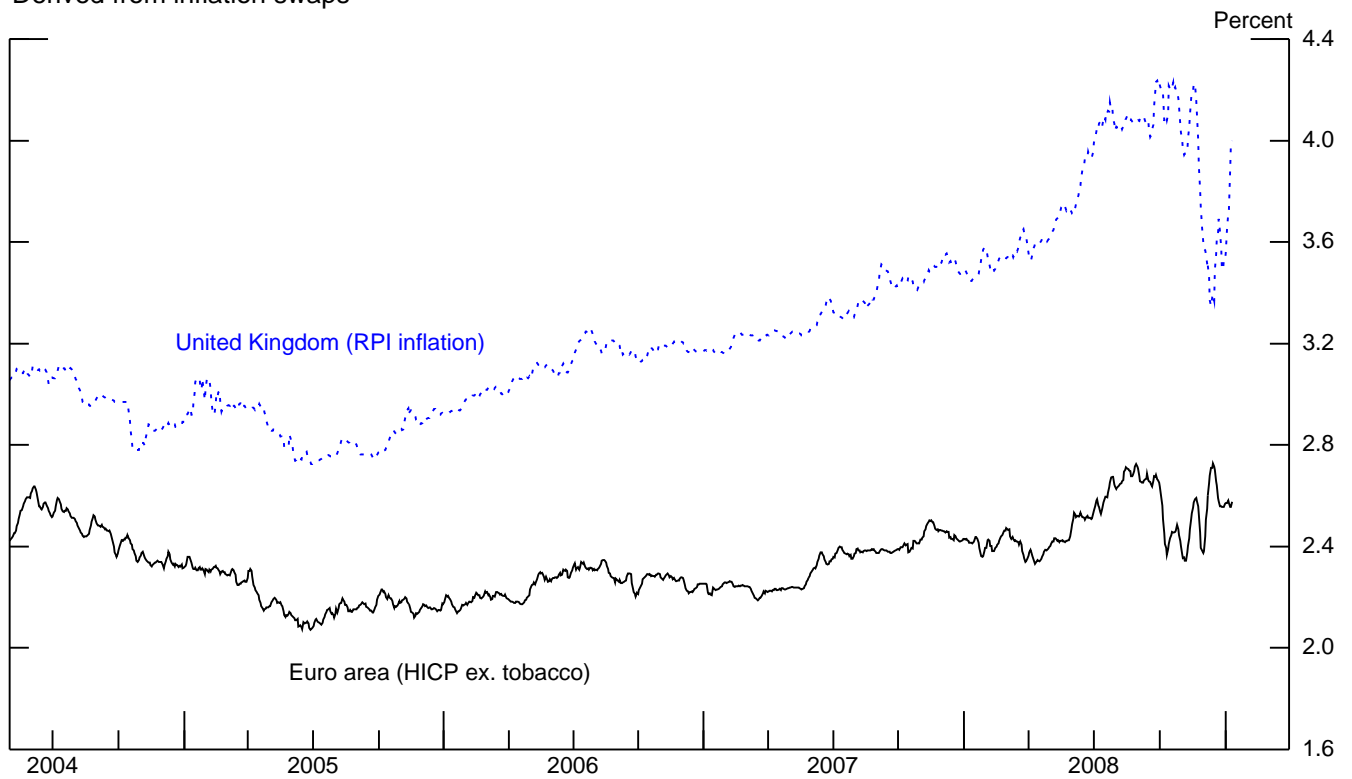


Figure 3b

Measures of Five-year Inflation Expectations Starting in Five Years

(Daily, five-day moving average)

Derived from inflation swaps



From breakeven inflation



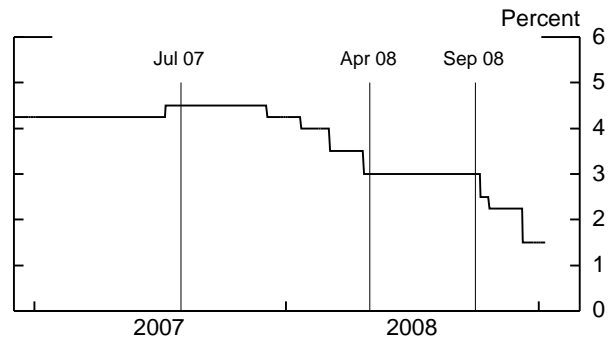
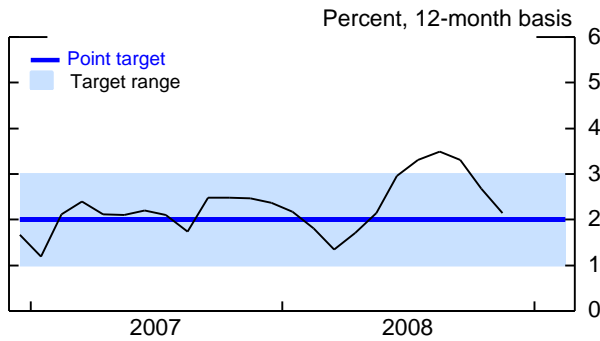
Figure 4

Recent History of Inflation, Inflation Objectives, and Policy Rates

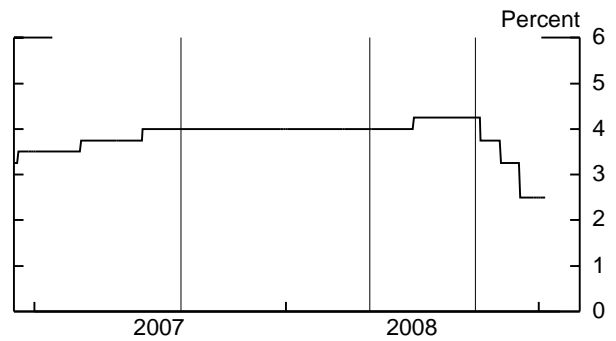
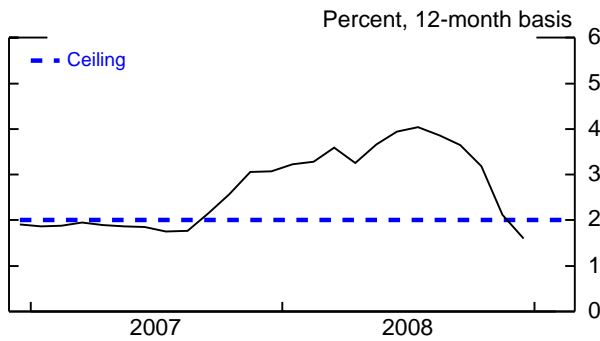
Inflation and Inflation Objectives

Canada

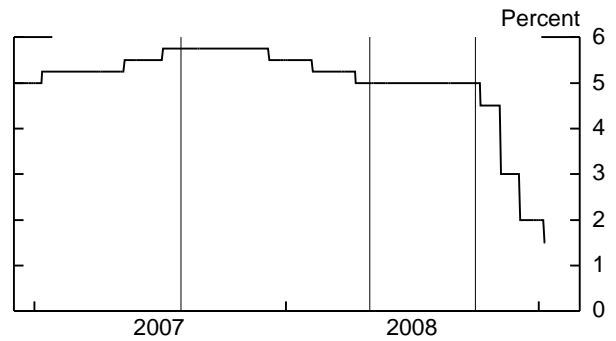
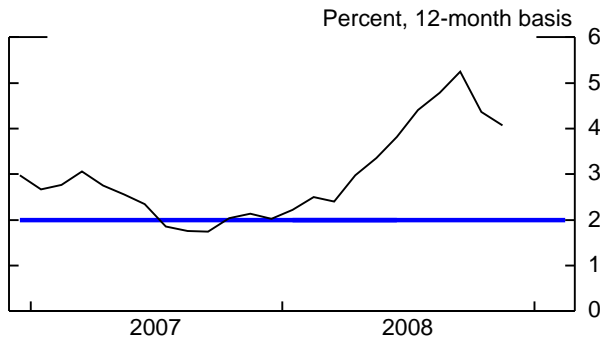
Policy rate



Euro Area

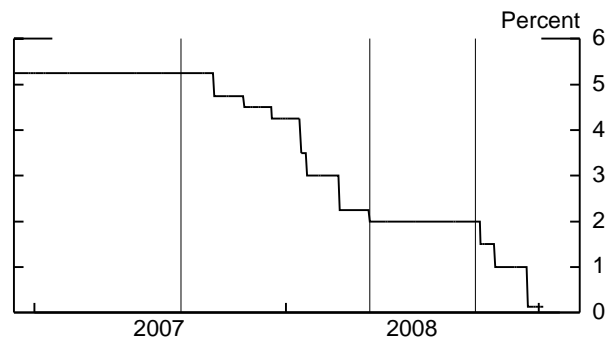
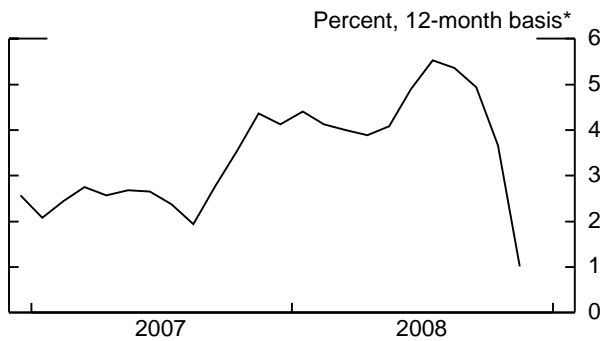


United Kingdom



Note: The Governor of the Bank of England must write a letter to the Chancellor when inflation is more than 1 p.p. away from the target.

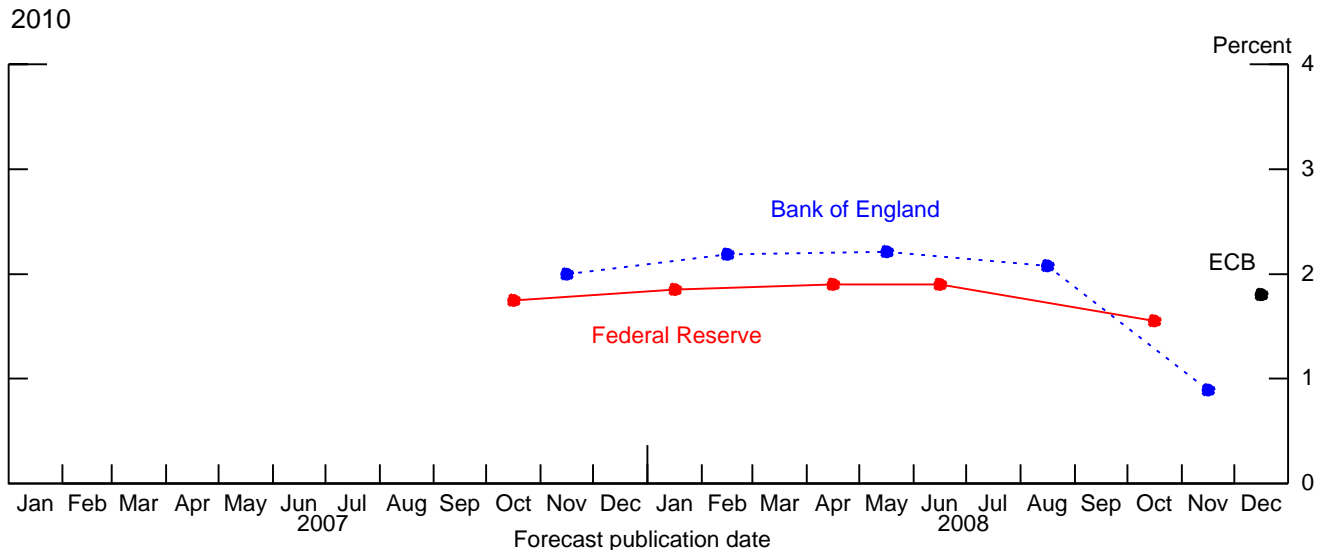
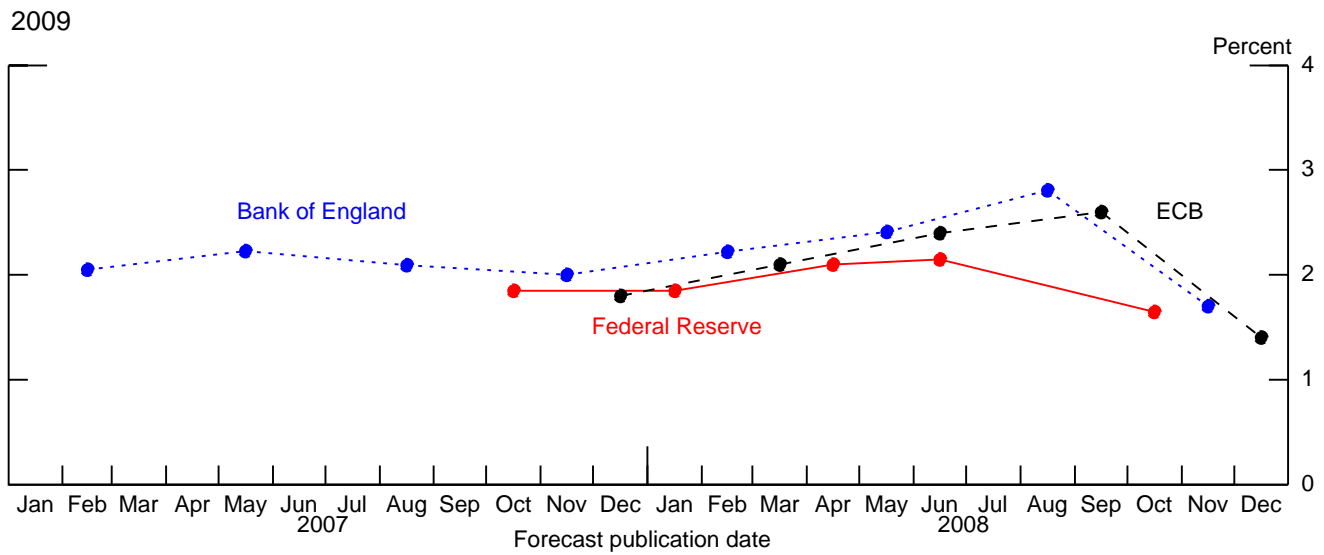
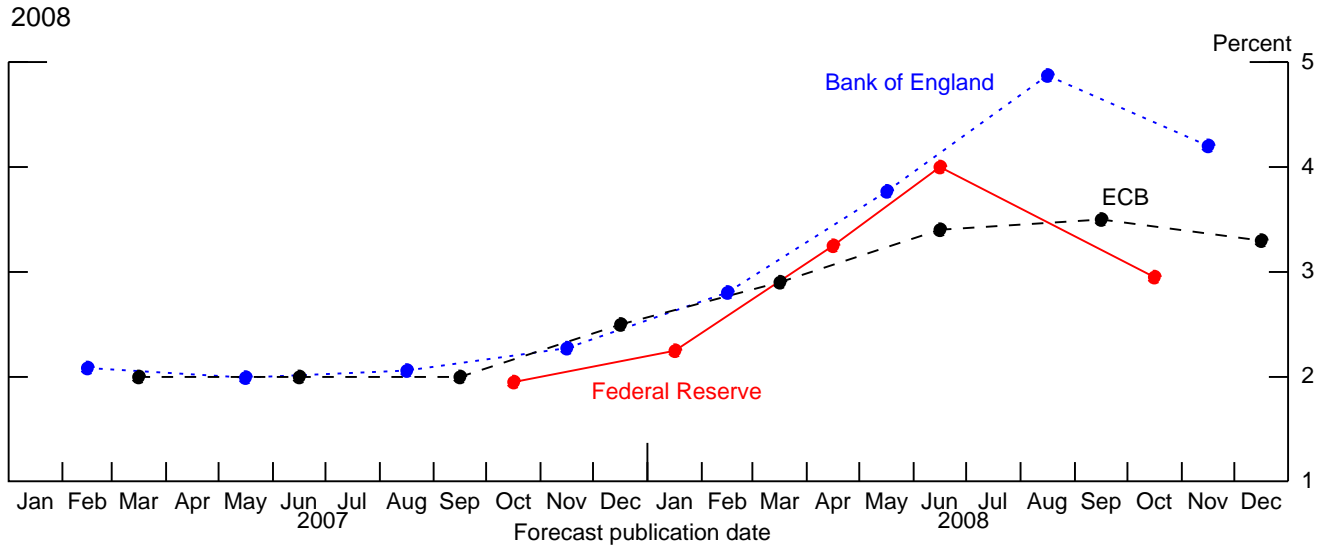
United States



* CPI inflation.

Figure 5a

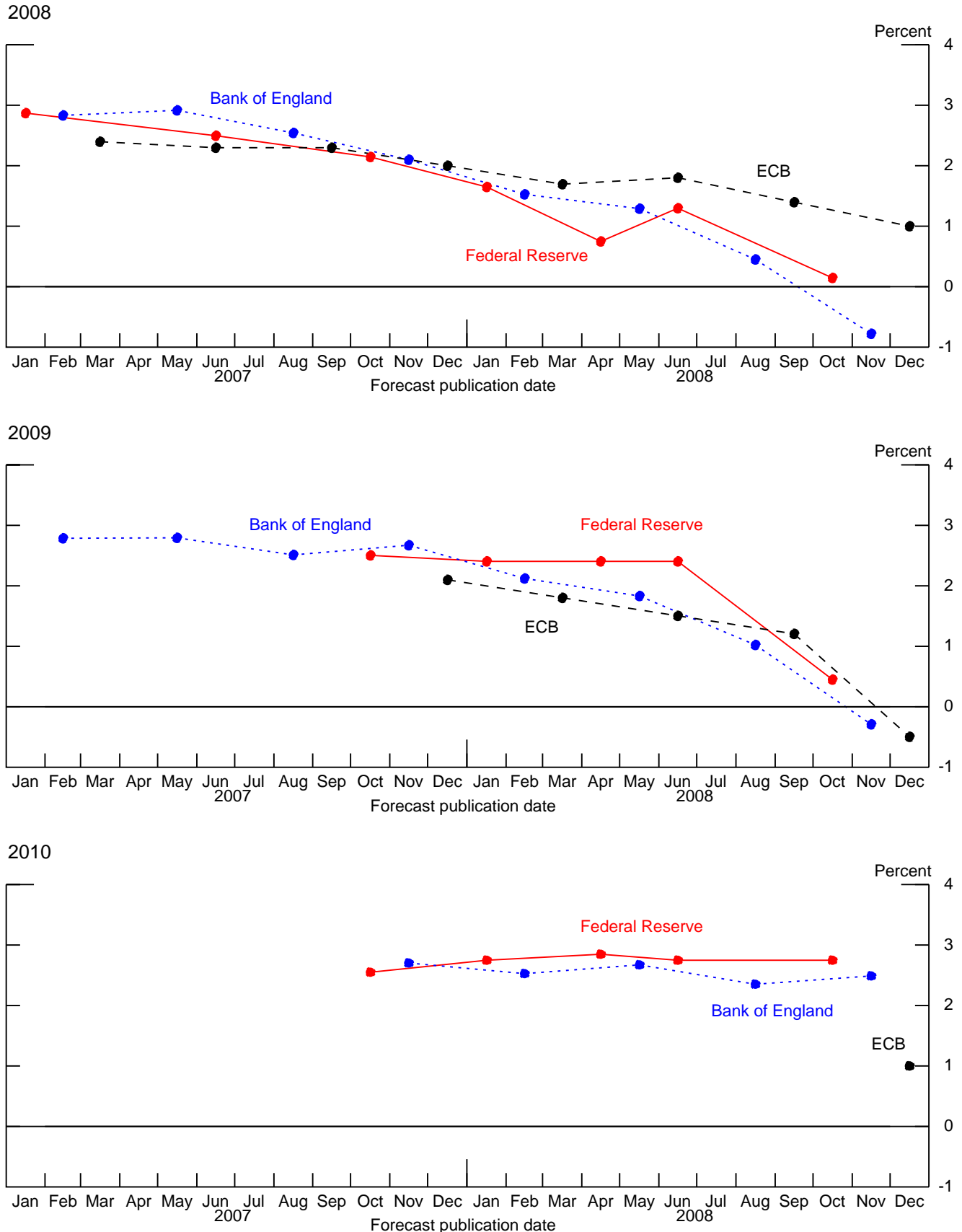
Evolution of Inflation Forecasts*



*Notes: Federal Reserve forecasts are the midpoint of the FOMC members' central tendency for total PCE inflation. The ECB's are the midpoint of range of the staff's published forecasts for the annual average change in the HICP. Bank of England's are the mean of the four-quarter change in CPI from the Inflation Report.

Figure 5b

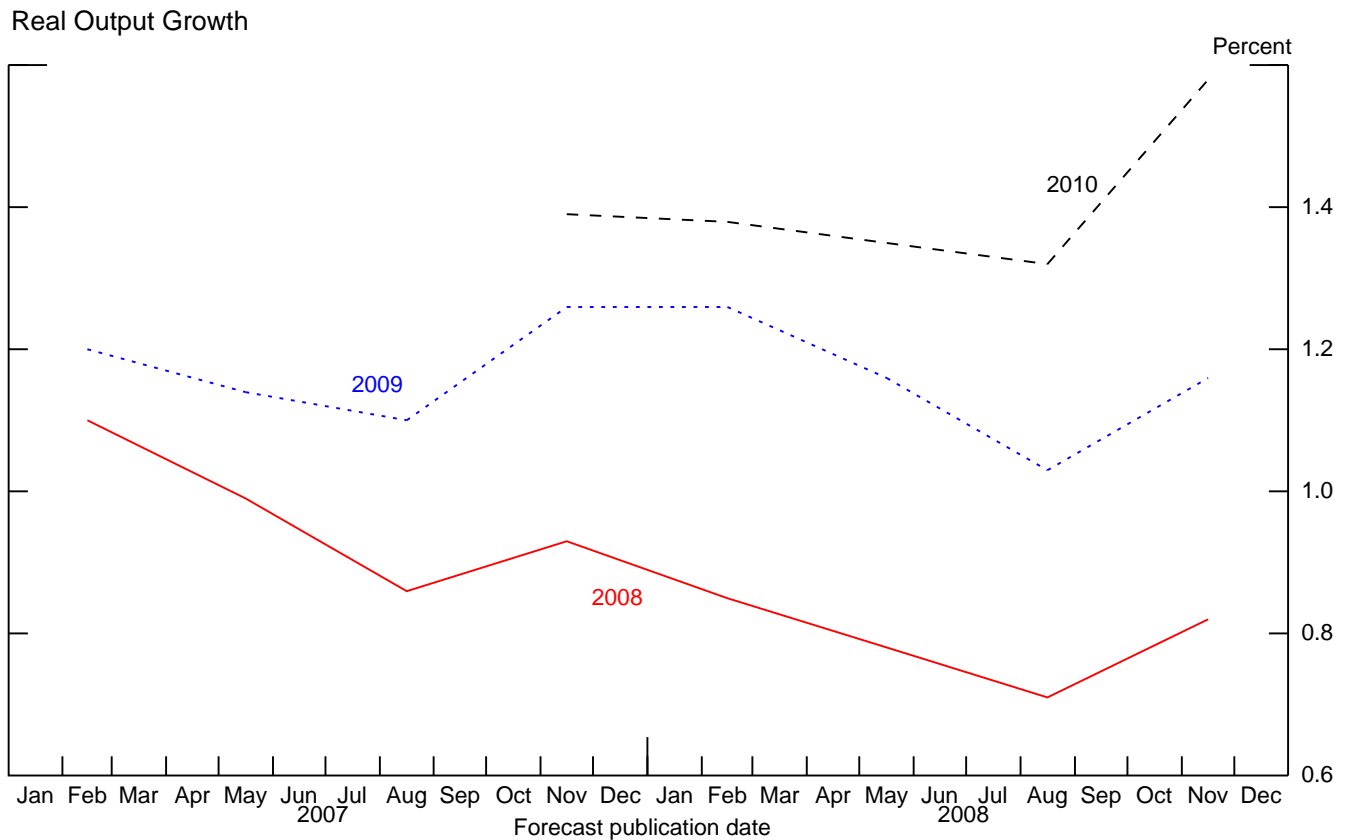
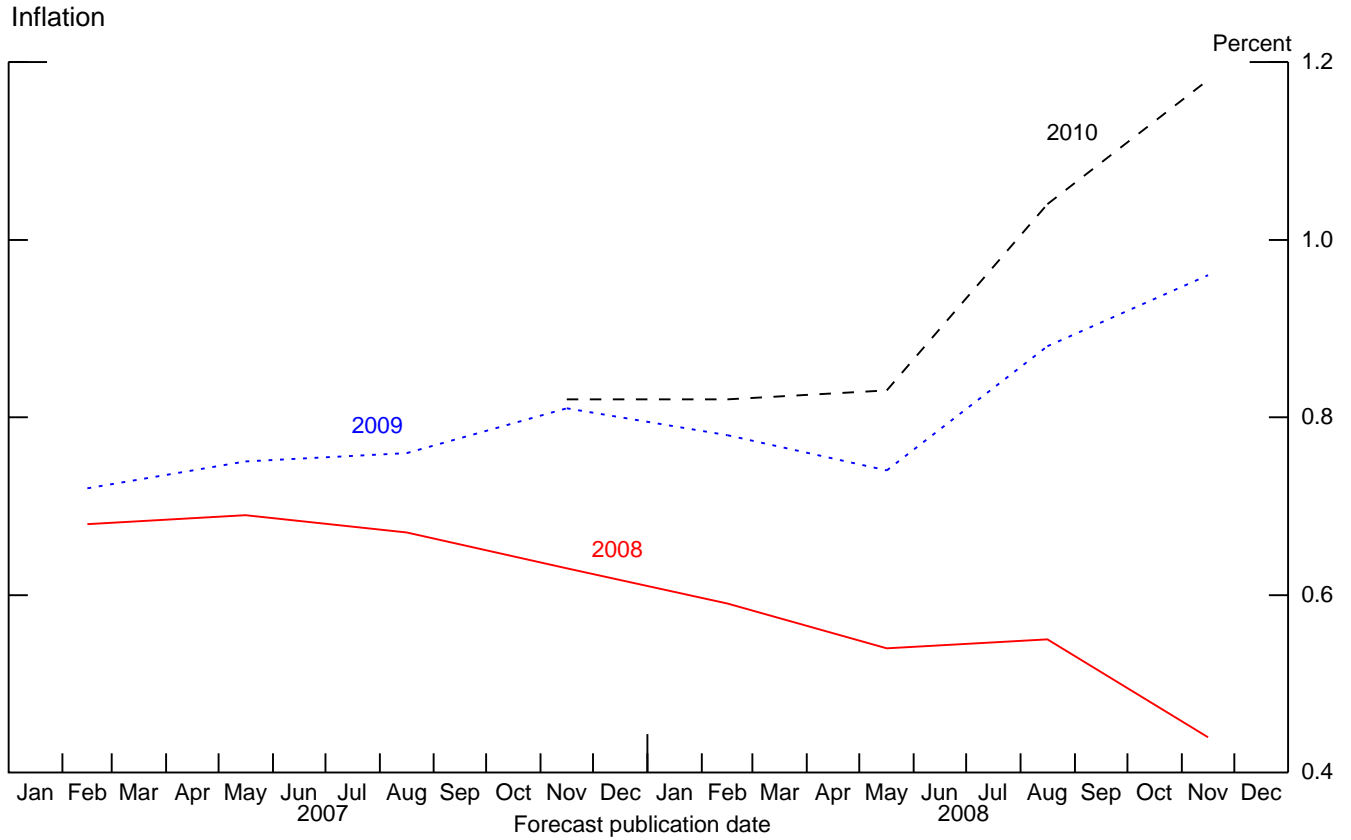
Evolution of Real GDP Growth Forecasts*



*Notes: Federal Reserve forecasts are the midpoint of the FOMC members' central tendency for the Q4/Q4 change in GDP. The Bank of England's are the mean Q4/Q4 forecasts from the Inflation Report. The ECB's are the midpoint of range of the staff's published forecasts of the annual average change in GDP.

Figure 6

Evolution of the Bank of England's Forecast Uncertainty*



*Notes: The Bank of England describes the measure of uncertainty 'as the 'input' standard deviation used in the construction of the distribution described by the fan chart.' See Britton, Fisher, and Whitley (1998) for further details.