The design and communication of systematic monetary policy strategies ☆

Andrew T. Levin

Research Department at the International Monetary Fund, United States

ARTICLE INFO

ABSTRACT

The efficacy of central bank communications is inextricably linked to the characteristics of the monetary policy framework. Therefore, this paper presents a set of fundamental principles regarding the joint design of monetary policy strategy and communications. The practical implications of these principles are illustrated by considering a number of significant policy challenges faced by central banks in the advanced economies.

Published by Elsevier B.V.

1. Introduction

Over the past two decades, central banks around the world have made tremendous strides in clarifying their monetary policy communications. Indeed, while many other aspects of monetary policymaking remain controversial, economists have reached a broad consensus regarding the strong rationale for clarity about the central bank's policy framework, that is, its longer-run goals and strategy, its assessments of the economic outlook, and its judgments about the appropriate path of policy.[1] In large part, the breadth of this consensus is a reflection of two distinct benefits:

- Clarity about the monetary policy framework bolsters the effectiveness of the *monetary transmission mechanism* by enhancing the private sector's understanding of how the stance of policy is likely to evolve in response to changes in economic and financial conditions.

---

[1] See Blinder et al. (2009) and Yellen (2013).

- Transparency about monetary policy is essential for maintaining the central bank's *operational independence* in a context of public accountability, thereby enabling its policy decisions to remain insulated from short-term political pressures.

Economic and financial developments in recent years have broadly confirmed the importance of clear central bank communications and in many instances have also underscored the scope for significant further improvements.

In contemplating these issues, it is essential to recognize that the efficacy of central bank communications is inextricably linked to the characteristics of the monetary policy framework. Therefore, this paper presents a set of fundamental principles regarding the *joint design of monetary policy strategy and communications*. These principles are framed in terms that are likely to be relevant for a wide array of central banks, including those of emerging markets and low-income countries. For the sake of brevity, however, the practical implications of these principles are generally illustrated using current policy challenges facing central banks in advanced economies. It should also be emphasized that such examples are solely for illustrative purposes and *not* intended to provide any definitive policy recommendations.

In particular, simple monetary policy rules can serve as valuable benchmarks for central banks in the decision-making process and in explaining those policy decisions to the public.[2] Of course, it would be inadvisable for policymakers to mechanically follow the prescriptions of a rule whose specification has been permanently fixed. However, in circumstances where policymakers judge that the stance of policy should deviate temporarily from the path prescribed by the policy rule, the rationale for doing so should be clearly explained to the public. Moreover, the central bank should maintain a systematic procedure for considering potential adjustments to the specification of its policy rule, recognizing that minor technical adjustments might occasionally be warranted whereas the fundamental characteristics would not be modified unless there were compelling reasons for doing so.

The remainder of the paper is organized as follows: Section 2 lays out several broad principles regarding monetary policy strategy and communications. Section 3 considers the framing of the central bank's inflation objective. Section 4 discusses the central bank's assessments of resource slack. Section 5 analyzes the use of simple policy rules as benchmarks. Section 6 considers the merits and limitations of specific communication tools. Section 7 concludes.

2. Some general principles

Central bank communications contribute to economic prosperity by facilitating well-informed decisions of households and businesses and by reducing economic and financial uncertainties. Clear communications also enhance the effectiveness of the monetary transmission mechanism by helping financial market participants and the general public understands how the stance of policy is likely to evolve in response to changes in economic and financial conditions. In recent decades, economists have also arrived at a broad consensus regarding the importance of insulating monetary policy decisions from short-term political pressures. However, the central bank's operational independence is only sustainable if the government provides a clear legal mandate regarding its policy objectives and instruments and then holds the central bank accountable over time for fulfilling that mandate. Consequently, enhancing the transparency of the central bank's policy framework and communicating clearly about the rationale for its specific policy decisions facilitate accountability to the general public and thereby reinforce the central bank's operational independence.[3]

⇒ *Provide regular communications regarding the central bank's assessments of the balance of risks to the economic outlook and contingency plans for mitigating and addressing such risks.*

Forecasters at many central banks and in the private sector have tended to focus on providing precise assessments of the modal outlook rather than on gauging the evolution of the balance of risks. Scenario analysis is a valuable tool for examining key risks and formulating contingency plans aimed at mitigating such risks. In effect, it may be beneficial for central banks to conduct and publish stress tests for monetary policy, analogous to the stress testing that is becoming standard practice for private financial institutions.

⇒ *Communicate clearly about the central bank's plans for adjusting the specific instruments that will be used in implementing its policy strategy over time.*

The central bank may be able to deploy a number of distinct monetary policy instruments, depending on its legal mandate and on the characteristics of the domestic financial system. For example, such tools may include direct lending to financial institutions, payment of interest on reserves, and transactions in publicly traded securities or foreign exchange. Thus, clarity about the central bank's monetary policy framework necessarily involves transparency about its choice of instruments, including its assessments of their efficacy, costs, and risks. There are also substantial benefits of clarifying the central bank's judgments regarding the appropriate path of policy as well as the conditions that could warrant significant adjustments to that path.[4]

---

[2] See Taylor and Williams (2010) for further analysis and discussion.

[3] Indeed, in his remarks at last December's official commemoration of the Federal Reserve's centennial, then-Chairman Bernanke (2013) stated: "Ultimately, however, the most important reason for transparency and clear communication is to help ensure the accountability of our independent institution to the American people and their elected representatives." See also Bernanke (2007) and Kohn (2014).

[4] See Gurkaynak et al. (2005), Swanson and Williams (2014), Stein (2014), and Yellen (2011, 2014).

⇒ *Foster and encourage a diversity of viewpoints in the process of formulating the central bank's policy decisions and communications.*

Historically, the institutional culture of central banks has tended to be quite conservative, with a strong inclination towards presenting a unified front in all public communications. However, effective risk management and contingency planning require "outside-the-box" thinking and creative problem-solving. These considerations underscore the institutional benefits of ensuring that both policymakers and staff represent a diverse set of backgrounds and perspectives.

3. The inflation objective

⇒ *Establish a numerical inflation objective that will serve as a fundamental benchmark for monetary policy strategy and communications.*

In the absence of an explicit inflation objective, the central bank may be particularly susceptible to short-term political pressures that lead to gradual upward drift in inflation expectations.[5] Conversely, empirical analysis has demonstrated that a transparent and credible inflation objective has significant effects in keeping inflation expectations firmly anchored, which in turn contributes to the stability of actual inflation.[6] Moreover, specifying a numerical inflation objective provides the central bank with greater flexibility to promote macroeconomic and financial stability.[7]

The process of initiating or revising the inflation objective depends on the central bank's institutional setting. In particular, the specification of this objective may be legislated in the central bank's charter or determined by periodic consultations with government authorities. Alternatively, the central bank itself may determine the inflation objective that is judged to be most consistent with its legal mandate. For example, in 2003 the Governing Council of the European Central Bank (ECB) established a quantitative definition of price stability–its mandate under the Maastricht Treaty–as keeping consumer price inflation "below but close to 2 percent over the medium term." More recently, the Federal Open Market Committee (FOMC) and the Bank of Japan (BOJ) have each established an inflation goal of 2 percent.

3.1. Specification

⇒ *The inflation objective should be defined in terms of a broad measure of consumer prices; that definition should only be adjusted for technical reasons.*

In the advanced economies, the inflation goal has generally been defined in terms of a broad measure of consumer prices, such as the consumer price index (CPI) or the price index for personal consumption expenditures (PCE). Such measures of inflation may also fluctuate in response to fiscal policy adjustments, such as a revision in government-administered prices or indirect tax rates. However, the central bank can readily make note of those factors in its monetary policy communications; indeed, the Bank of Japan (BOJ) has regularly done so in explaining the implications of recent and prospective value-added tax (VAT) rate hikes.

It should be noted that significant communication challenges may arise if the inflation goal is defined in terms of a price index that responds directly to movements in the level of short-term interest rates. For example, a monetary policy tightening aimed at restraining inflation pressures may nonetheless induce an near-term *upward* shift in such an inflation measure. In light of such concerns, the Bank of England's inflation target was initially defined in terms of the retail price index excluding mortgage payments (RPIX) rather than the overall retail price index (RPI). A few years later, the Bank of England's inflation target was redefined in terms of the CPI, but that redefinition was clearly explained as a technical adjustment and hence did not undermine the credibility of the monetary policy framework.[8]

⇒ *The numerical value for the inflation objective should be re-examined periodically but should only be modified for compelling economic reasons.*

To serve as an effective nominal anchor, the inflation objective must be transparent and credible; that is, the private sector must have a reasonable degree of confidence that this objective will be sustained over time and that the central bank will take actions as warranted to fulfill that objective. Indeed, in analyzing the early experiences of several inflation-targeting central banks, Bernanke et al. (1999) found that the private sectors inflation expectations tended to move only gradually in the wake of the initial announcement of the inflation objective. Moreover, such patterns do not necessarily reflect sluggish information flows or irrationality; rather, the evidence indicates that even professional forecasters tend to

---

[5] See Levin and Taylor (2013).

[6] See Levin et al. (2004), Gurkaynak et al. (2010), and Beechey et al. (2011).

[7] The Federal Open Market Committee's statement on longer-run goals and policy strategy (FOMC, 2014) indicates: "Communicating this inflation goal clearly to the public helps keep longer-term inflation expectations firmly anchored, thereby fostering price stability and moderate long-term interest rates and enhancing the Committee's ability to promote maximum employment in the face of significant economic disturbances."

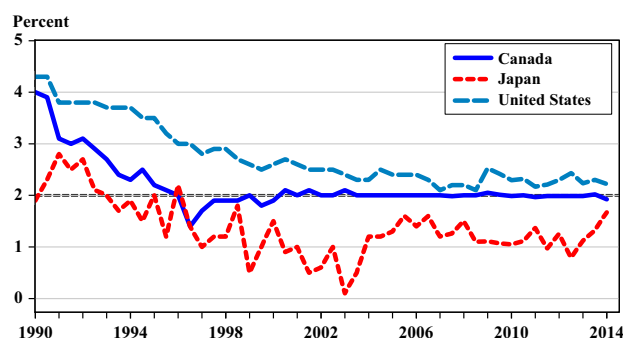[8] See King (2004) and Gurkaynak et al. (2010).

Fig. 1. The Evolution of Longer-Run Inflation Expectations in Three Advanced Economies. Source: Consensus Forecast longer-run surveys of CPI inflation projections 6 to 10 years ahead, published semiannually in April and October. Copyright (c) Consensus Economics Inc.

take a wait-and-see approach in assessing the extent to which a significant institutional change is likely to be durable over time.[9]

The numerical value of the inflation objective is appropriately determined in light of assessments of the relative costs of inflation, the extent of downward nominal wage rigidity, and the costs and risks associated with the zero lower bound on nominal interest rates. Such assessments might well evolve over time as a result of new data and empirical analysis, and hence the specific value of the inflation objective should *not* be viewed as having been set permanently in stone. On the other hand, frequent tinkering with the specification of this objective incurs the risk of undermining its clarity as well as its credibility.[10] Consequently, the specification of the inflation objective should be revisited on a periodic but relatively infrequent basis–perhaps once every five or 10 years–in the context of a comprehensive review of the central bank's policy framework. Moreover, such reviews must be systematic and transparent to ensure that any modification of the inflation goal would only occur as a consequence of compelling economic reasons rather than short-term political pressures.

To illustrate the foregoing principles, it is helpful to consider the evolution of longer-run inflation expectations in three advanced economies, as depicted in Fig. 1.

Canada: In early 1991, the Canadian government and the Bank of Canada agreed on a policy framework with a medium-term inflation target of 2 percent for the total consumer price index (CPI). Initially, that target does not appear to have been fully credible: as of spring 1992, professional forecasters still anticipated that CPI inflation would settle at around 3 percent over the longer run. Over time, however, inflation expectations moved into line with the target, facilitated by the Bank of Canada's actions and communications and underpinned by the breadth of public support for its policy framework. Indeed, survey evidence and financial market data indicate that inflation expectations in Canada have remained firmly anchored since the late 1990s.[11] Moreover, the monetary policy framework has been reviewed regularly at five-year intervals, but each of those reviews has concluded that the existing policy framework continued to be workable and appropriate; cf. Carney (2011).

United States: Longer-term U.S. inflation expectations drifted steadily downward during the 1990s–a period in which the Federal Reserve did not have an explicit inflation objective but pursued a course of policy that has been characterized as "opportunistic disinflation.[12] That course of policy effectively ended in mid-2003, when the Federal Open Market Committee (FOMC) indicated that a substantial further decline in inflation would be unwelcome. Consequently, professional forecasters longer-term outlook for U.S. consumer inflation levelled off at around 2 percent, although empirical analysis subsequently indicated that inflation expectations were still not as firmly anchored as in a number of other economies that had established an explicit numerical inflation objective. In January 2012, the FOMC established a longer-term inflation goal of 2 percent, as measured by the price index for total personal consumption expenditures (PCE), and has reaffirmed that inflation goal at each of its annual organization meetings since then.[13]

Japan: During the 1990s, the Bank of Japan (BOJ) indicated that it was aiming at modestly positive levels for published measures of inflation, thereby keeping the true underlying rate of inflation close to zero. The Consensus Economics longer-run

---

[9] See Evans and Wachtel (1993) and Erceg and Levin (2003).

[10] DePooter et al. (2014) analyzed data for three emerging-market economies and found that inflation expectations were somewhat less firmly anchored in Brazil (where the inflation target is specified on a year-to-year basis) compared with Chile and Mexico (each of which has a fixed target for inflation).

[11] The Consensus Economics survey results indicate that professional forecasters longer-run outlook for Canadian inflation has stayed very close to the 2 percent target throughout the past 15 years. Moreover, Gurkaynak et al. (2006) analyzed Canadian daily data on forward inflation compensation that is, the difference between forward rates on nominal and inflation-linked bonds and found that far-forward inflation compensation did not respond significantly to either Canadian or U.S. macroeconomic news.

[12] See Meyer (1996) and Orphanides and Wilcox (2002).

[13] It should be noted that Fig. 1 shows the evolution of the longer-run outlook for U.S. CPI inflation–the measure used in Consensus Forecast surveys. The Federal Reserve Bank of Philadelphias quarterly Survey of Professional Forecasters (SPF) elicits projections for both the CPI and the PCE price index. In the May 2014 survey, the SPF's median projection for the 10-year average U.S. PCE inflation rate was exactly 2 percent, while the corresponding projection for U.S. CPI inflation was a notch higher at 2 1/4 percent, virtually identical to the outlook in the April 2014 Consensus survey.

outlook for Japanese CPI inflation declined gradually during the 1990s, it remained at around 1 percent through the subsequent decade even as headline inflation was generally running below zero.[14] In March 2013, the BOJ announced a strong commitment to taking the requisite quantitative and qualitative policy measures in order to achieve its 2 percent inflation goal. The BOJ's actions and communications evidently succeeded in bolstering the credibility of its inflation goal: as of April 2014, the longer-run Consensus outlook for Japanese CPI inflation stood at 1.7 percent, up from 1.1 percent a year earlier and higher than any previous reading since the mid-1990s.

3.2. Time frame

⇒ *The central bank must clearly convey its assessments of the time frame over which inflation is projected to converge to its objective and the policy actions that are likely to be warranted in fostering that convergence process.*

Generally speaking, the framing of any goal may be practically meaningless without some sort of concrete plan for achieving that goal within a reasonable time frame. Thus, to ensure that its inflation objective serves as an effective nominal anchor, the central bank must clearly communicate its strategy for bringing inflation back to the objective, including the anticipated time frame for the convergence process as well as the policy actions that are likely to be warranted.

The appropriate time frame for closing the inflation gap–that is, the deviation of actual inflation from its objective– evidently depends on conjunctural conditions. For example, if a transitory commodity price shock induces a spike in consumer price inflation, policymakers may reasonably anticipate that inflation is likely to revert to its objective fairly quickly even in the absence of any policy actions. Conversely, an ongoing acceleration in commodity prices may exert persistent upward pressure on inflation, and a significant monetary policy tightening might indeed be warranted to offset such pressures and bring the inflation rate back to its objective. Indeed, in the absence of clear communications about the central bank's policy strategy, longer-run inflation expectations could become dislodged and exacerbate the upward pressure on actual inflation.

Inflation gaps can also arise from shifts in aggregate demand that may result from changes in fiscal policy, external demand, or credit market frictions. During "normal" times, the central bank can take prompt action to offset such shifts, thereby stabilizing resource utilization and keeping the inflation rate close to its objective. In contrast, when faced with a large and protracted decline in aggregate demand, monetary policy can become constrained by the zero lower bound on nominal interest rates, and hence the shortfall in aggregate demand may exert persistent downward pressure on the inflation rate.[15] Under such circumstances, the rationale for clear monetary policy communications becomes even more compelling:

To illustrate some practical implications of this principle, we briefly consider recent developments and prospects for inflation in the United States and the euro area.

United States: U.S. inflation plummeted during the Great Recession and remained subdued during the early stages of the economic recovery. Indeed, Federal Reserve officials flagged the risk of further disinflation or deflation as a key rationale for launching a second round of large-scale asset purchases (commonly known as QE2) in late 2010.[16] In the first half of 2011, headline inflation moved sharply upwards in the wake of surging global prices of energy and other commodities, and measures of core inflation also headed upward, reflecting pass-through of higher input prices as well as the effects of supply-chain disruptions in the aftermath of a tragic earthquake and tsunami in Japan. At that juncture, the FOMC clearly indicated its judgment that those developments were largely transitory and hence that consumer inflation would "subside to levels at or below those consistent with the Committee's dual mandate as the effects of past energy and other commodity price increases dissipate." (FOMC, 2011)

As shown in Fig. 2, that expectation proved to be well-founded. The four-quarter average rate of PCE inflation peaked at around 2 3/4 percent in 2011:Q3 and then headed steadily downward toward a level of about 1 percent. As of early spring 2014, FOMC participants and professional forecasters generally expected that PCE inflation would head gradually upward toward the FOMC's 2 percent inflation goal. Indeed, at that juncture the FOMC made note of the risk that inflation could remain flat or decline further over coming quarters.[17]

Euro Area: As noted above, the ECB's policy strategy since 2003 has been explicitly intended to maintain euro area CPI inflation "below but close to 2 percent over the medium run." The ECB President subsequently defined this time frame very specifically: "The medium term for a central bank is a period of 18 months to two years." (Trichet, 2008). Actual inflation has exhibited substantial fluctuations in recent years, dropping close to zero in the wake of the global financial crisis and then

---

[14] In 2006 the nominal anchor was framed more specifically in terms of year-to-year changes in the CPI, and policy board members' assessments of the appropriate value for the inflation goal had a midpoint of 1 percent. In early 2012, the BOJ specified a numerical inflation goal of 1 percent for the time being" and a year later the BOJ revised its inflation goal upward to 2 percent.

[15] Matheson et al. (2013) analyzed inflation developments in the advanced economies in the wake of the global financial crisis.

[16] See Bernanke (2010) and Yellen (2011).

[17] During the first half of 2014, each FOMC meeting statement indicated that "The Committee recognizes that inflation persistently below its 2 percent objective could pose risks to economic performance, and it is monitoring inflation developments carefully for evidence that inflation will move back toward its objective over the medium term."
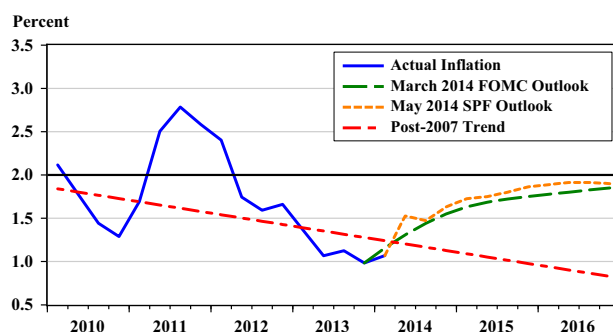
Fig. 2. The U.S. inflation outlook. *Note*: In this figure, actual U.S. inflation (solid line) is measured by the four-quarter average change in the PCE price index. The FOMC's inflation outlook (long-dashed line) is represented by taking the midpoint of the central tendency of the PCE inflation projections of individual Committee participants, as published in the March 2014 Summary of Economic Projections (SEP). The private sector's inflation outlook (short-dashed line) is represented by the projections for PCE inflation published in the May 2014 edition of the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters (SPF). The post-2007 trend (dot-dashed line) is estimated by ordinary least squares regression using quarterly data for the period 2007:Q1 to 2014:Q1.
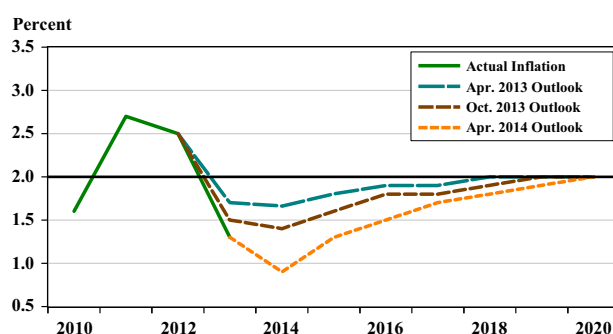

Fig. 3. The inflation outlook for the Euro area. *Source*: Consensus forecast longer-run surveys of CPI inflation projections 6–10 years ahead, published semiannually in April and October. Copyright (c) Consensus Economics Inc.

rising above 2 1/2 percent following the global surge in commodity prices. In the face of those developments, however, the ECB succeeded in keeping longer-run inflation expectations anchored at around 2 percent.[18]

As shown in Fig. 3, the inflation outlook for the euro area deteriorated markedly over the course of 2013 and early 2014.[19] According to the Consensus Economics longer-run survey published in April 2014, forecasters expected that euro area inflation would rise only gradually over coming years before eventually converging to the ECB's inflation objective towards the end of the decade–a far longer convergence horizon than would be implied by a "medium run" time frame. Moreover, there were notable downside risks to that outlook: In the ECB's May 2014 survey of professional forecasters, respondents assigned a 30 percent probability to outcomes in which the inflation rate in 2015 would remain below one percent. In light of those risks, ECB officials indicated that they were prepared to take further policy actions to foster a more satisfactory inflation outlook and to ensure that inflation expectations would remain firmly anchored.

3.3. Financial stability considerations

> ⇒ *The central bank should ensure that financial stability considerations do not undermine the public's confidence in its nominal anchor.*

The global financial crisis spurred the recognition that price stability and macroeconomic stability are inextricably linked to the stability of the financial system. Moreover, while macroprudential supervision and regulation should serve as the first line of defense in averting financial crises, there is a growing consensus that monetary policy adjustments may also be warranted under some circumstances. While a full discussion of the implications for the design of monetary policy strategy and communications would go well beyond the scope of this paper, one key aspect bears emphasis at this juncture.[20]

---

[18] See Beechey et al. (2011) and Galati et al. (2011).

[19] The contours of the inflation outlook in the ECB's quarterly survey of professional forecasters (available at http://www.ecb.europa.eu/stats/prices/indic/forecast) are very similar to the Consensus survey results shown in Fig. 3.

[20] For further analysis and discussion, see Svensson (2013) and Alichi et al. (2014).
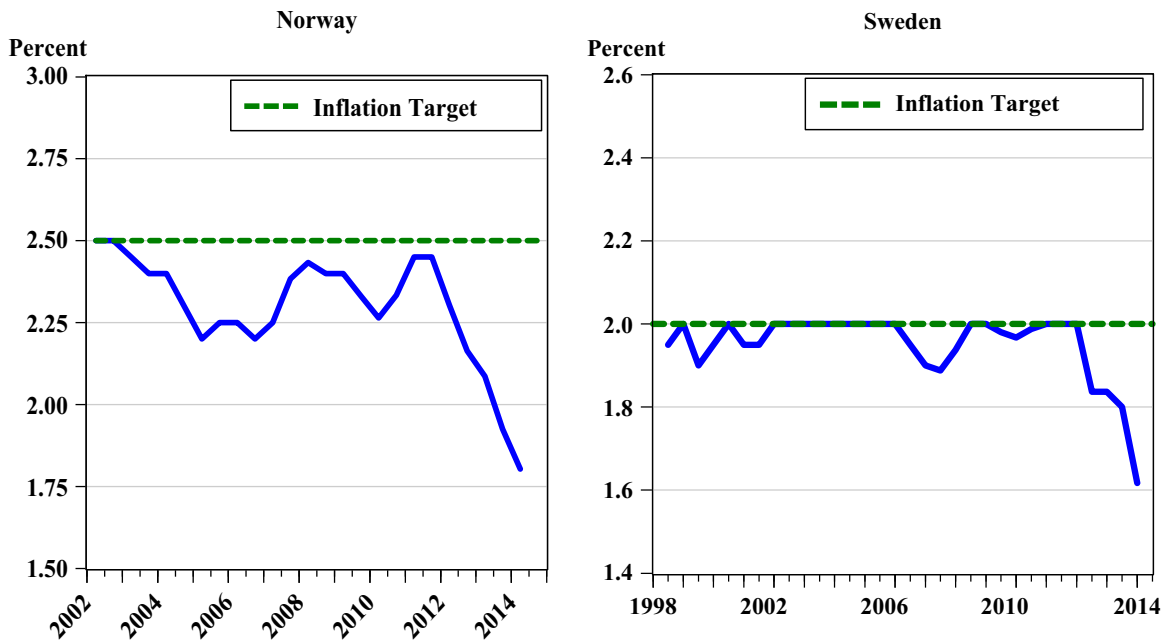
Fig. 4. The evolution of longer-run inflation expectations in two Scandinavian economies. *Note*: Each panel depicts the central bank's inflation target (dashed line) and the evolution of longer-run inflation expectations (solid line), as measured by a moving average of the latest two semiannual Consensus forecast surveys of CPI inflation projections 6–10 years ahead. Copyright (c) Consensus Economics Inc.

In particular, it seems to be essential to ensure that financial stability concerns do not undermine the public's confidence in the central bank's nominal anchor. Indeed, keeping longer-term inflation expectations firmly anchored is almost surely a crucial element in fostering the safety and soundness of the financial system. Conversely, a policy strategy that allows inflation expectations to drift over time seems likely to be counterproductive for financial stability as well as price stability.

Fig. 4 points to the potential relevance of this issue for two Scandinavian economies. The Sveriges Riksbank's inflation target of 2 percent was established in 1993, and by the late 1990s longer-run inflation expectations were well-anchored at that target. Norges Bank's inflation target of 2.5 percent was established in 2001, and over the subsequent decade it succeeded in keeping longer-run inflation expectations close to that target. More recently, however, both of these central banks maintained a relatively tight stance of monetary policy aimed at mitigating emerging financial imbalances, even as inflation dropped persistently below target in each economy. Consequently, longer-run inflation expectations–at least as measured by Consensus Economics surveys–began drifting downward noticeably.

The incidence of disagreement among forecasters tends to be highly correlated with the degree of uncertainty about the economic outlook; cf. D'Amico and Orphanides (2008). Consequently, measures of cross-sectional dispersion can also serve as useful indicators of the extent to which longer-run inflation expectations are firmly anchored.[21] For example, the TNS Sifo Prospera survey (which is conducted on behalf of the Sveriges Riksbank) indicates that the degree of dispersion regarding the Swedish inflation outlook widened notably over the past several years. In particular, the cross-sectional standard deviation of 5-year-ahead inflation projections increased from 0.30 percent in January 2011 to 0.52 percent in July 2014. Over the same period, the mean forecast in the TNS Sifo Prospera survey declined about 0.3 percentage points to a level of about 1.8 percent.[22] Moreover, since the extent of dispersion is directly linked to the degree of sampling uncertainty associated with any specific survey, these results do not appear to be significantly different from those obtained from the Consensus Economics longer-run surveys.

4. Assessments of resource slack

⇒ *The central bank should regularly communicate its assessments of resource slack and the degree of uncertainty surrounding those assessments.*

One of the cornerstones of modern macroeconomics is that every economy has a balanced-growth path that is consistent with keeping inflation stable at its desired rate. With that conceptual framework in mind, there are two compelling reasons for assessing the magnitude of *resource slack*–that is, the level of economic activity relative to the balanced-growth path– and incorporating such assessments into the central bank's monetary policy strategy and communications. First, shortfalls in

---

[21] See Gurkaynak et al. (2010) and Beechey et al. (2011).
[22] The survey methodology and the detailed results are available at *http://www.prospera.se/reports/inflation-expectations*.

aggregate income and employment have direct human costs, because households experience a lower level of economic wellbeing. Second, rates of resource utilization influence the setting of wages and prices, and hence persistent resource slack tends to exert downward pressure on inflation; conversely, persistently elevated rates of utilization tends to induce upward pressure on inflation. Consequently, the monetary policy goals of macroeconomic stability and price stability are generally–though not always–complementary.

Of course, the contours of the balanced-growth path cannot be directly measured, so its characteristics must be inferred using statistical analysis of observable data. Moreover, such estimates are necessarily uncertain and subject to revision, and the extent of that uncertainty may be highly relevant in determining the course of monetary policy. These considerations underscore the benefits of regular communication of the central bank's assessments of resource slack as well as the degree of uncertainty surrounding those assessments.

To illustrate these issues, the remainder of this section focuses on challenges in gauging the magnitude of labor market slack–an issue that is of particular relevance for U.S. and U.K. policymakers at the current juncture.

4.1. Deviations from Okun's law

In his classic work, Okun (1962) documented a set of empirical comovements between real output and the unemployment rate–often referred to as *Okun's Law*–that have proven to be remarkably robust over time and across a wide array of countries.[23] For example, the following version of Okun's Law is estimated using annual U.S. data from 1980 to 2007:

$$\Delta u_t = \underset{(0.16)}{1.26} - \underset{(0.04)}{0.43} \Delta y_t \tag{1}$$

where Δu_t denotes the change in the unemployment rate (Q4/Q4), Δy_t denotes the growth rate of real GDP (Q4/Q4), and the standard error of each regression coefficient is shown in parentheses. This equation has a remarkably good fit ($R^2 = 0.79$), and the residuals exhibit no serial correlation at all (DW=1.89).

In effect, Okun's Law indicates that the unemployment rate will tend to decline when the growth of actual GDP exceeds its potential growth rate, and conversely, that unemployment will tend to show little or no improvement when real GDP growth is roughly in line with its longer-run normal rate. As shown in Fig. 5, however, the recent evolution of the U.S. economic outlook does not seem to have been consistent with that pattern.

As shown in the upper panel of the figure, real GDP growth from 2010 through early 2014 consistently underperformed relative to the FOMC's economic outlook.[24] For example, in November 2010 the FOMC indicated that the economic recovery had been "disappointingly slow" and launched its second round of large-scale asset purchases (QE2); at that time FOMC participants generally expected that by 2012 the pace of real GDP growth (Q4/Q4) would pick up to about 4 percent. In fact, however, output growth during 2011–2012 only averaged about 2 percent–not even reaching most participants' assessments of its longer-run normal rate. Consequently, in September 2012 the FOMC initiated a third round of asset purchases (QE3), with the expectation that output growth would subsequently pick up to around 3 1/2 percent.[25] Unfortunately, the economy underperformed yet again during 2013, with GDP growing notably slower than Committee participants' assessments of its potential growth rate (which had been revised downward about a half percentage point relative to their assessments three years earlier).

In light of Okun's Law, one might have expected that the persistent underperformance in economic growth would have been associated with relatively little improvement in the unemployment rate. In fact, however, as shown in the lower panel, the decline in unemployment over that timeframe was much steeper than the FOMC anticipated.[26] For example, the FOMC's June 2011 meeting statement conveyed the expectation that unemployment would "resume its gradual decline," and the statement issued in November 2011 indicated that the Committee expected that unemployment would "decline only gradually towards levels judged to be consistent with its mandate." At that FOMC meeting, participants generally projected that the unemployment rate would be close to 8 percent as of 2013:Q4. In fact, however, the unemployment rate plummeted to around 6 3/4 percent by the end of 2013 and to around 6 percent by mid-2014–only slightly higher than the upper end of the central tendency of FOMC participants' assessments of its longer-run normal rate.

---

[23] See recent studies by Ball et al. (2013) and Daly et al. (2014).

[24] In 2007 the FOMC initiated the quarterly publication of its Summary of Economic Projections (SEP), which reports the central tendency and range of Committee participants' projections for GDP growth, unemployment, and inflation. (The phrase "Committee participants" refers to all of the members of the Board of Governors and presidents of the Federal Reserve Banks.) In 2009 the FOMC further enhanced its communications by reporting on participants' estimates of the longer-run normal rates to which those variables would converge over time in the absence of further shocks. In effect, the SEP's longer-run projections convey participants' assessments of the characteristics of the balanced-growth path, that is, the *potential GDP growth rate* and the *natural rate of unemployment* (often referred to as the NAIRU).

[25] At that meeting, the FOMC also announced its expectation that a highly accommodative stance of policy would likely remain warranted "for a considerable period as the economic recovery strengthens" and that liftoff from the ZLB was not likely to be warranted "at least until mid-2015."

[26] From November 2010 to April 2011, FOMC meeting statements projected "a gradual return to higher levels of resource utilization." The June 2012 FOMC statement projected that the unemployment rate would "resume its gradual decline", while subsequent FOMC statements projected that the unemployment rate would "decline only gradually" (August 2011 to January 2012), "decline gradually" (March and April 2012), "decline only slowly" (June and August 2012), and "gradually decline" (January 2013 to January 2014).
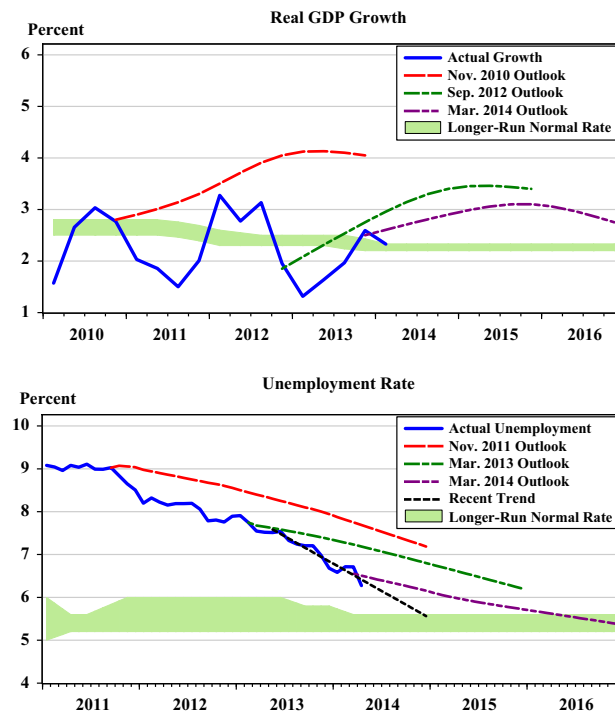
Real GDP Growth

Unemployment Rate

Fig. 5. The evolution of the U.S. economic outlook. *Note*: The upper panel depicts the actual path of U.S. real GDP growth (solid line) from 2010:Q1 through 2014:Q1, along with the midpoint of the central tendency of FOMC participants' projections for the trajectory of GDP growth (Q4/Q4) as of November 2010 (dashed), September 2012 (dot-dashed), and March 2014 (dot-dot-dashed). The lower panel depicts the actual path of the U.S. unemployment rate (solid line) from January 2011 through April 2014; the midpoint of the central tendency of FOMC participants' projections for the path of the unemployment rate (Q4 average) as of November 2011 (long-dashed), March 2013 (dot-dashed), and March 2014 (dot-dot-dashed); and the linear trend based on the latest 12 months of unemployment readings. In each panel, the shaded area denotes the evolution of the central tendency of FOMC participants' assessments of the longer-run normal rate; those central tendencies are simply extended from March 2014 through the end of 2016 for illustrative purposes.

These departures from Okun's Law can be gauged in terms of the out-of-sample forecast errors from Eq. (1) over the period from 2008 to 2013. As shown in the left panel of Fig. 6, the deviations from Okun's Law have been remarkably large and persistent. The historical residuals (1980–2007) have a standard error of 0.44 percent, so that a deviation of around −1 percent would be expected to occur no more than once in a 20-year period. And given that the historical residuals are serially uncorrelated, a sequence of *three consecutive deviations* of that magnitude would be exceedingly rare, say, once in 10,000 years.

In interpreting these deviations from Okun's Law, one key element is that potential GDP growth appears to have shifted downward substantially in recent years.[27] Indeed, CBO (2014) estimated that potential GDP growth had an average rate of about 1.5 percent during 2011–2013, compared with an average rate of about 3 percent over the period 1980–2007. Using the estimated slope coefficient of 0.43 in Eq. (1), that decline in potential GDP growth would induce a downward shift in the residuals of about 0.65 percent–roughly half the magnitude of the forecast errors shown in the left panel of Fig. 6.

However, it is also important to consider the possibility that the recent trajectory for unemployment may have at least partly reflected a decline in labor force participation that was induced by the sluggish pace of the economic recovery.[28] Indeed, Okun himself flagged this issue in his classic paper:

> In a slack labor market, people without a job may give up when they are convinced that job-hunting is a hopeless pursuit. They then may be viewed as having left the labor force though they stand ready and eager to work. The response of participation rates is likely to be a complicated lagged phenomenon which will not be closely tied to the current unemployment rate. While this aspect of the difference between potential and actual output is hard to quantify, zero is certainly not a satisfactory estimate. (Okun 1962, pp. 5–6)

---

[27] Fernald (2014) provides comprehensive and detailed analysis on this issue.

[28] A number of recent studies have analyzed this issue, including Aaronson et al. (2012), Sherk (2012), Van Zandweghe (2012), Hotchkiss and Rios-Avila (2013), Erceg and Levin (2013), and Hornstein et al. (2014).
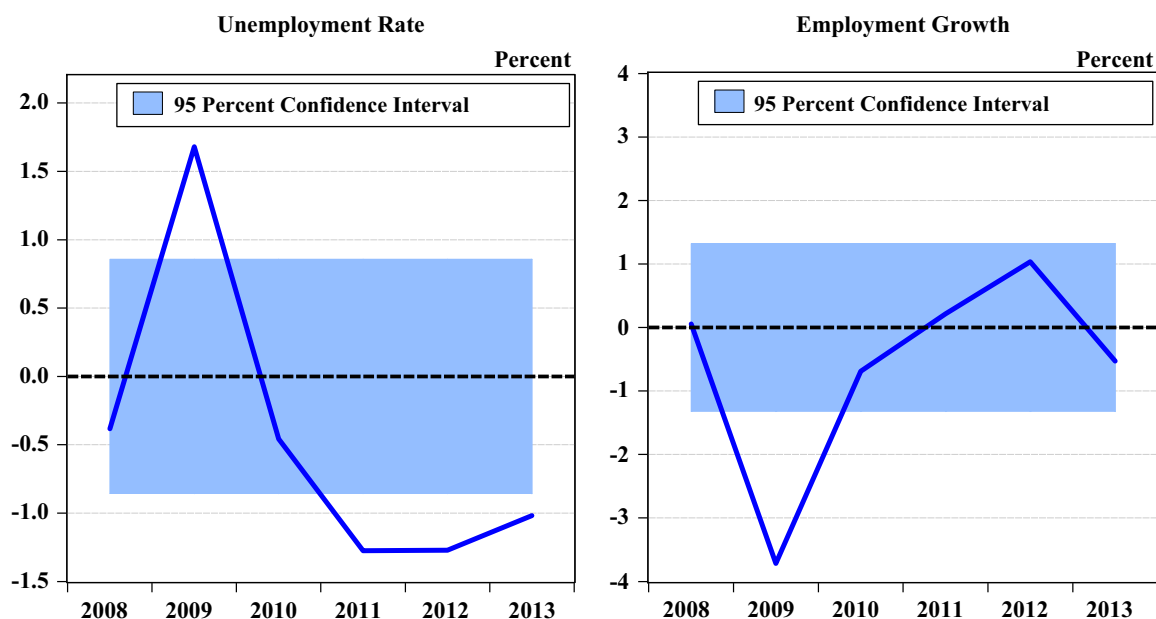
Unemployment Rate

Employment Growth

Fig. 6. U.S. Deviations from Okun's Law. Note: This figure depicts out-of-sample forecast errors for 2008 to 2013 as implied by two versions of Okun's Law estimated using U.S. annual data from 1980 to 2007. The left panel shows the forecast errors associated with equation (1), which is specified in terms of changes in the unemployment rate. The right panel shows the corresponding implications of equation (2), which is specified in terms of employment growth. In each panel, the shaded region denotes the 95 percent confidence interval based on the standard error of each regression.

Thus, we now turn to the following variant of Okun's Law involving *employment growth* rather than changes in the unemployment rate:

$$\Delta e_t = \underset{(0.23)}{-0.14} + \underset{(0.70)}{0.50} \Delta y_t \tag{2}$$

where Δe_t denotes the growth rate of total employment (Q4/Q4). As above, this specification has a good fit over the sample period 1980–2007 ($R^2 = 0.69$), and the residuals exhibit no serial correlation at all (DW=1.74).

The out-of-sample forecast errors from Eq. (2) are shown in the right panel of Fig. 6. Notably, the forecast errors for the period 2010–2013 vary in sign from year to year and fall well within the 95 percent confidence interval–a much better out-of-sample fit than Eq. (1). These results bolster the view that the unexpectedly steep decline in unemployment over that timeframe was indeed related to the concomitant drop in labor force participation.

4.2. The composition of labor market slack

As discussed in the Bank of England's May 2014 *Inflation Report*, the employment gap can be represented as a sum of three components: the unemployment gap, the participation gap, and the underemployment gap. In particular, the *unemployment gap* is the deviation of actual unemployment from the NAIRU, and the *participation gap* is the deviation of the actual labor force from its equilibrium level. The *underemployment gap* refers to the incidence of involuntary part-time work relative to its normal level, that is, the incidence of individuals who are currently working part-time (less than 30 h/week) who would prefer to have a full-time job but are unable to find one.

The upper panel of Fig. 7 shows the Bank of England's assessments, as of May 2014, regarding the magnitudes of the specific components of the U.K. employment gap. Each component is scaled by its standard deviation over the period 1992–2007 in order to reflect the extent to which the current magnitude of that gap exceeds its normal variability. Evidently, all three components became quite large in the wake of the global financial crisis and remained sizeable through 2011. As the U.K. labor market subsequently improved notably, the participation gap essentially disappeared and the unemployment rate reverted close to its normal level, whereas the underemployment gap remained about two standard deviations away from Bank staff's current assessment of its medium-term equilibrium.

The lower panel depicts an assessment of the evolution of the total U.S. employment gap in terms of these three components. The unemployment gap refers to the deviation of actual unemployment from the CBO (2014) estimate of the NAIRU, and the participation gap refers to the difference between the actual size of the labor force and the CBO' (2014) estimate of the potential labor force. The estimate of the underemployment gap shown here is obtained using a trend-cycle decomposition of the incidence of involuntary part-time work; detailed information is provided in the appendix. Evidently, while U.S. labor market conditions improved substantially since 2010, this estimate suggests that the U.S. employment gap
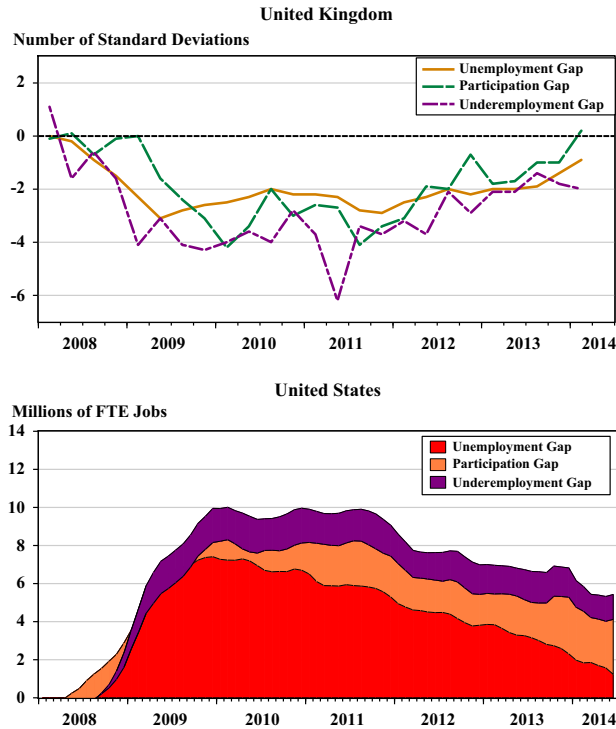
United Kingdom

Fig. 7. The magnitude and composition of labor market slack. *Note*: In the upper panel (which borrows directly from Chart 3.7 of the Bank of England's May 2014 Inflation Report), the unemployment gap is the difference between the actual unemployment rate and the Bank staff's estimate of its medium-term equilibrium rate; the participation gap is the difference between the actual labor force participation rate and the Bank staff's estimate of its medium-term equilibrium rate; the underemployment gap is the difference between average weekly hours worked and Bank staff's estimate of its medium-term equilibrium level; and each of these gaps is scaled by its own standard deviation (computed for the period 1992–2007). The lower panel depicts the level of the U.S. employment gap (expressed in millions of full-time equivalent (FTE) jobs) and its components, where the unemployment gap is the deviation of actual unemployment from the CBO's estimate of its longer-run natural rate, the participation gap is the deviation of the labor force from the CBO's estimate of its potential level, and the derivation of the underemployment gap is shown in the appendix.

remained quite large as of spring 2014 and that the participation gap and the underemployment gap accounted for the bulk of that gap.[29]

5. Using simple policy rules as benchmarks

⇒ Simple monetary policy rules can serve as valuable benchmarks in determining the course of monetary policy and explaining those judgments to the public.

No macroeconomic model provides a completely satisfactory description of any economy in the real world. Indeed, the limitations of existing macroeconomic models have been underscored by the incidence of relatively large and persistent forecast errors in many advanced economies over the past few years.[30] Thus, rather than relying on the monetary policy implications of any single macro model, it seems to be sensible to develop simple rules that provide reasonably robust performance across a range of plausible models. Such rules can serve as valuable benchmarks in the decision-making process and in explaining those decisions to the public. For example, following the seminal work of Taylor (1993), a vast literature has investigated the specification and performance of simple monetary policy rules of the following form:

$$i_t = r^* + \pi_t + \alpha(pi_t - pi^*) + \beta(x_t - x_t^*) \tag{3}$$

where i_t denotes a measure of the short-term nominal interest rate, r^* denotes the equilibrium real interest rate, pi_t is a smoothed measure of inflation, pi^* is the central bank's inflation objective, $x_t - x_t^*$ is a measure of resource slack, and the coefficients α and β are chosen appropriately in order to foster the stability of economic activity and inflation. For example, the Taylor (1993) rule was specified in terms of GDP price inflation and the output gap, with $r^* = 2$, $\pi^* = 2$, and $\alpha = \beta = 0.5$.[31]

---

[29] Blanchflower and Posen (2014) analyzed panel data and found highly significant effects of the participation gap and the underemployment gap on nominal wage setting in the United States and the United Kingdom, respectively.

[30] See Romer and Romer (2014).

[31] Taylor (1980) set forth the seminal analysis of the "monetary policy frontier" in terms of the relative variability of economic activity and inflation. Taylor (1999) reported on a comprehensive analysis of the performance of simple policy rules across a wide range of macroeconomic models.

Nonetheless, there are two distinct reasons why it would be inadvisable for policymakers to mechanically follow the prescriptions of a rule whose specification has been permanently fixed:

- Economic conditions may occasionally arise that are not well-captured by any of the models that were used in formulating the policy rule. Thus, in certain circumstances policymakers might judge that the stance of policy should deviate temporarily from the path prescribed by the policy rule, and the rationale for doing so would need to be clearly explained to the public.
- The salient characteristics of the set of plausible models will inevitably evolve over time, reflecting new economic and financial data and ongoing improvements in analytical and empirical methods as well as changes in the structure of the economy itself. Consequently, the central bank should have a systematic procedure for considering potential adjustments to the specification of its policy rule. Minor technical adjustments may occasionally be warranted, but the basic specification of the policy rule would not be modified unless there were compelling reasons for doing so.

To illustrate these considerations, the remainder of this section focuses on two practical issues that are currently facing monetary policymakers in a number of advanced economies. It should be noted that a number of other important issues–such as the appropriate degree of policy inertia or implications of uncertainty about natural rates–cannot be addressed within the scope of this paper.[32]

5.1. The equilibrium real interest rate

Conceptually, the equilibrium real interest rate is the level of short-term real interest rates at which the economy evolves along its balanced-growth path and inflation remains at its objective.[33] Of course, as with other properties of the balanced-growth path, the level of the equilibrium real interest rate cannot be directly measured but must be inferred from observed economic and financial data. For example, Taylor (1993) specified the value $r^* = 2$ based on the historical average value of the real federal funds rate.

However, there are strong conceptual and empirical reasons to expect that the equilibrium real interest rate may move significantly in response to a shift in total factor productivity growth that changes the pace of output growth along the balanced-growth path. Moreover, econometric analysis suggests that the level of r^* may also vary over time in response to other domestic and global economic developments. Such shifts in the value of r^* can be consequential for the performance of a simple policy rule. For example, if the economy were on its balanced-growth path $(x_t = x_t^*)$ but the true value of the equilibrium real interest rate were a percentage point lower than the value specified in the monetary policy rule, then inflation would persistently fall short of its objective; e.g., with $\alpha = 0.5$, the prevailing inflation rate would be zero instead of 2 percent.

As shown in Fig. 8, professional forecasters' assessments of equilibrium real interest rates shifted downward substantially over the past few years. Prior to the onset of the global financial crisis, the consensus outlook for the far-ahead forward real federal funds rate (left panel) was roughly in line with the value of 2 percent embedded in the Taylor (1993) rule. The consensus outlook subsequently declined to around 1 1/4 percent–a decrease that is roughly comparable to the reduction of about 0.6 percentage points in forecasters' longer-run projections for U.S. GDP growth (not shown). The dispersion in forecasters' views is evident from the interquartile range, which effectively covers the entire interval from 0 to 2 percent. Substantial downward revisions in r^* have also occurred for a number of other advanced economies (right panel).[34]

5.2. Measures of Inflation and Resource Slack

For a policy rule like Eq. (3) to serve as a practical benchmark for monetary policy, the central bank needs to clarify which measures of inflation and resource slack will be used in computing its prescriptions. During normal times, the particular specification of those measures may be fairly innocuous. For example, a quarter-point difference between two measures of inflation would only imply a difference of about 40 basis points in the prescriptions of the Taylor (1993) rule, and a half percentage point difference between two measures of resource slack would only affect the Taylor rule's prescriptions by 25 basis points.

In contrast, when a large shock has pushed the economy relatively far away from its balanced-growth path, the specification of the measures of inflation and resource slack may become highly consequential. For example, Taylor's (1993) rule was specified in terms of the output gap, which CBO (2014) estimated at -4.3 percent as of 2014:Q1. Thus, with the coefficient $\beta = 0.5$, the Taylor rule would imply a funds rate reduction of about 2 percentage points (assuming a constant value of r^* and with inflation at its target rate).

---

[32] Orphanides and Williams (2002) analyzed the implications of uncertainty about potential output and the natural rate of interest in the formulation of simple policy rules, and Eggertsson and Woodford (2003) analyzed the benefits of history dependence when the policy instrument is constrained by the ZLB; see also Woodford (2003).

[33] From Eq. (3), it is evident that the real interest rate $i_t - pi_t$ is equal to r^* when $\pi = \pi^*$ and $x_t = x_t^*$.

[34] Furceri and Pescatori (2014) provide comprehensive analysis of the evolution of global real interest rates over the past several decades and in the wake of the financial crisis.
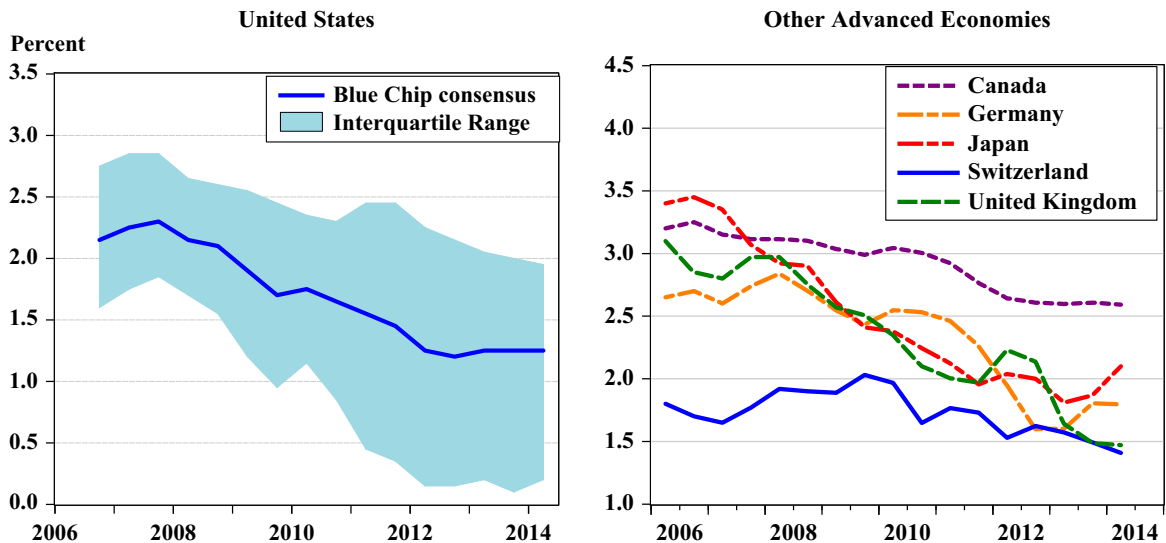
Fig. 8. The evolution of professional forecasters' assessments of equilibrium real interest rates. *Note*: The left panel shows the consensus outlook (solid line) and interquartile range (shaded area) of professional forecasters' projections for the average level of the U.S. 3-month treasury bill rate 6–10 years ahead, less the consensus of their projections for the average level of U.S. CPI inflation 6 to 10 years ahead, computed as a moving average of the latest two semiannual *Blue Chip Economic Indicators* longer-run surveys. Copyright (c) Aspen Publishers, Inc. The right panel shows corresponding results taken from Consensus Economics' semiannual longer-run surveys regarding the expected average level of 10-year Treasury bond yields 6 to 10 years ahead less the expected average level of CPI inflation 6 to 10 years ahead; these results are shown for Canada (short-dashed), Germany (dot-dashed), Japan (dot-dot-dashed), Switzerland (solid), and the United Kingdom (long-dashed). Copyright (c) Consensus Economics Inc.

One plausible alternative would be to use the unemployment gap as the measure of resource slack. Indeed, Orphanides and Williams (2002) suggested that the prescriptions from the following rule would be roughly equivalent to those of the Taylor rule:

$$i_t = r^* + \pi_t + 0.5(pi_t - pi^*) - 1.0(u_t - u_t^*) \tag{4}$$

where u_t denotes the actual unemployment rate, u_t^* denotes the NAIRU, and the coefficient of -1.0 on the unemployment gap was based on the usual application of Okun's Law.[35] CBO (2014) estimated that the NAIRU would remain steady at 5.5 percent through the remainder of this decade, implying that the unemployment gap was about 0.75 percentage points as of mid-2014. Consequently, according to this specification, the prevailing degree of resource slack would only call for a modest funds rate reduction of less than a percentage point, all else equal.

Conversely, the preceding analysis in Section 4 may provide a compelling rationale for specifying the benchmark rule in terms of the employment gap rather than the unemployment gap, especially when there are large and persistent deviations from the unemployment rate version of Okun's law. As shown in the lower panel of Fig. 7, the total U.S. employment gap was close to 3.5 percent as of 2014:Q1–that is, about three times as large as the unemployment gap. Consequently, using the same coefficient of -1.0 as in the preceding specification, this measure of resource slack would call for a funds rate reduction of about 350 basis points, all else equal.

6. Communication tools

6.1. Post-meeting statements and press conferences

⇒ *The head of the monetary policy committee should hold a press conference following every regular-scheduled meeting.*

In recent years, there have been numerous instances in which an abrupt shift in the economic outlook has warranted a prompt and decisive monetary policy response. That experience has underscored the importance of having regular monetary policy meetings at which policymakers can carefully consider the incoming economic and financial information and determine whether any action would be appropriate at that particular juncture. Moreover, policymakers need to be prepared to provide a prompt explanation to the public regarding the rationale for each policy decision, regardless of whether the decision involves action or inaction.

In all of the advanced economies, the monetary policy committee has a regularly scheduled meeting every few weeks. For example, the Bank of England's MPC and the Bank of Japan's policy board each convene on a monthly basis, while the

---

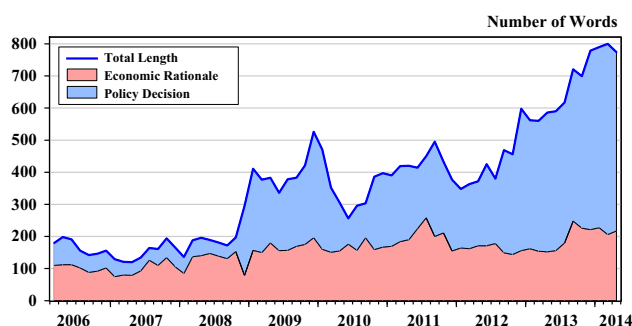[35] See the discussion of Eq. (1) in Orphanides and Williams (2002).

Fig. 9. The evolution of FOMC meeting statements. *Note*: This figure shows the number of words in each of the FOMC statements that were issued in conjunction with regularly scheduled meetings from March 2006 through April 2014. This word count does not include voting tallies, dissenting views (if any), or separate decisions of the Federal Reserve Board (as distinct from the FOMC). The content of each FOMC statement is categorized as follows: (i) the Committee's *policy decision*, that is, the actions taken at the meeting as well as any forward guidance about the likely future path of policy; and (ii) the Committee's *economic rationale*, including its synopsis of recent developments and its description of the economic outlook and the balance of risks.

FOMC and the Bank of Canada's governing council each hold meetings eight times per year.[36] Of course, a monetary policy committee can also convene unscheduled meetings as needed–either in person or via conference call–but such meetings are quite rare apart from crisis situations.

The standard practice for every monetary policy committee is to issue a written statement following the conclusion of each regularly scheduled meeting, but the purpose and structure of such statements varies significantly across central banks. In some cases, the post-meeting statement is very brief and simply conveys the substance of the current policy decision. For example, following its meeting on 8 May 2014, the ECB issued the following statement: "At today's meeting, which was held in Brussels, the Governing Council of the ECB decided that the interest rate on the main refinancing operations and the interest rates on the marginal lending facility and the deposit facility will remain unchanged at 0.25 percent, 0.75 percent, and 0.00 percent, respectively." On the same day, the Bank of England released the following statement: "The Bank of England's Monetary Policy Committee at its meeting today voted to maintain Bank Rate at 0.5 percent. The Committee also voted to maintain the stock of purchased assets financed by the issuance of central bank reserves at 375 billion."

In contrast, some central banks–including the Bank of Canada, the BOJ, and the FOMC–generally issue much longer post-meeting statements that provide a specific description of the policy decision and explain the economic rationale for that decision. As shown in Fig. 9, FOMC statements typically comprised about 150–200 words during the first two years of Chairman Bernanke's tenure in 2006–2007. The total length of FOMC statements surged during the financial crisis and continued rising over subsequent years to around 800 words by spring 2014. That upward trend mainly reflected the increased complexity of policy decisions involving large-scale asset purchases and forward guidance about the pace of purchases as well as the timing and pace of liftoff of the federal funds rate from the zero lower bound. In addition, the economic rationale in each FOMC statement was also expanded from about 100 words prior to the crisis to around 200 words more recently.

It has also become standard practice for central banks to hold regular press conferences at which the head of the monetary policy committee presents some opening remarks and then engages in Q&A.[37] The media participants typically represent a wide spectrum of news outlets, including mainstream and social media as well as the financial press. Consequently, central banks have generally found press conferences to be an effective platform for explaining the central bank's policies to the general public as well as for addressing more specific points that are relevant for analysts and other specialists. The frequency of press conferences varies noticeably across central banks. The Federal Reserve Chair holds a press conference following each quarterly FOMC meeting at which committee participants update their assessments of the economic outlook. At the Bank of Canada and the Bank of England, press conferences are held once per quarter in conjunction with the release of monetary policy reports. In contrast, at the BOJ and the ECB, press conferences take place every month at the conclusion of each monetary policy meeting.

Recent experience points to the merits of relatively frequent press conferences and the limitations of post-meeting statements. For example, as shown in the left panel of Fig. 10, all of the significant revisions to the FOMC's policy decisions from early 2012 through spring 2014 occurred in conjunction with quarterly press conferences. In principle, of course, the FOMC could make substantive adjustments to its policy stance at any meeting, even if there were not any press conference afterwards. But the reality is that 30-60 min of Q&A can provide a much more comprehensive explanation than a few hundred words in a written statement. Indeed, as shown in the right panel of the figure, revisions to the economic rationale in FOMC statements over the past few years rarely involved changing more than about 50 words. Consequently, there seems to be a strong case for arranging press conferences to be held in conjunction with *every* regularly scheduled meeting, so that the monetary policy committee has the flexibility to take action whenever warranted while ensuring that such actions are clearly and promptly communicated to the public.

---

[36] The ECB's governing council has traditionally held monthly policy meetings but recently announced that it will be shifting to a schedule of eight monetary policy meetings per year starting in 2015.

[37] At some central banks, one or more deputies also participate in the press conference and assist with the Q&A.
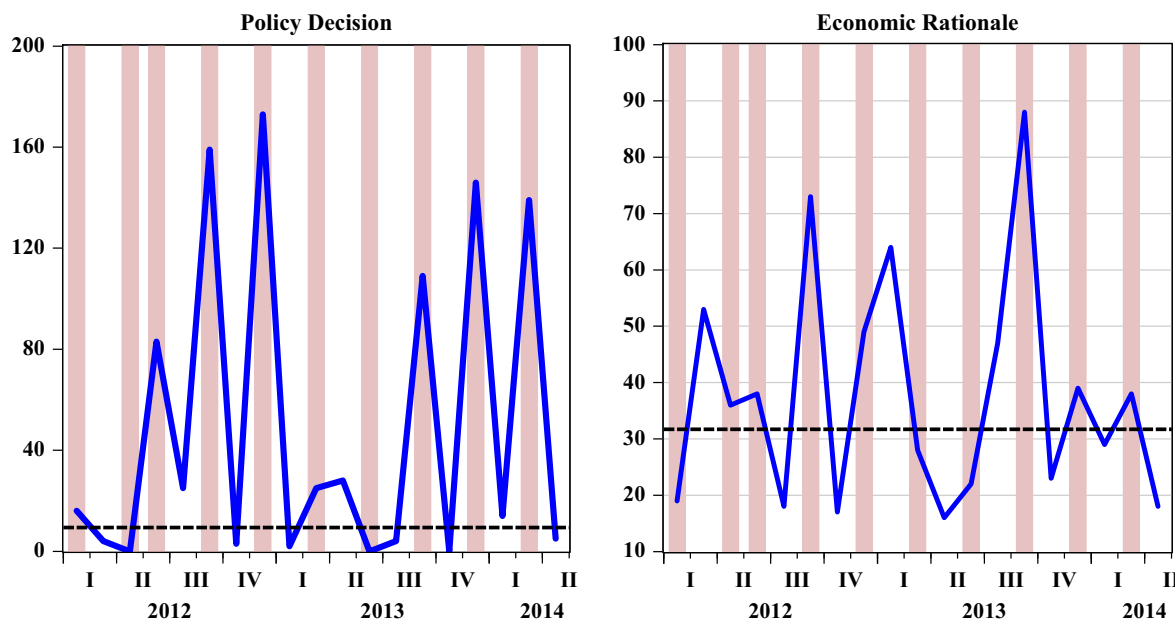
Fig. 10. Revisions in FOMC statement language (number of word changes from previous FOMC statement). *Note*: This figure depicts the incidence of revisions to the FOMC statement issued after each regularly scheduled meeting since January 2012 compared with the FOMC statement from its previous regularly scheduled meeting. The number of revisions is obtained by counting how many words have been inserted or modified (not including rearrangements in word order). The decomposition of the content into the policy decision (left panel) and economic rationale (right panel) is described in the notes to the preceding figure. In each panel, the shaded bars denote instances in which the Federal Reserve Chair held a press conference following the conclusion of the FOMC meeting, and the dashed line indicates the mean number of revisions which were made at FOMC meetings that did *not* include a press conference.

6.2. Monetary policy reports

⇒ *The central bank should publish quarterly monetary policy reports that provide a detailed rationale for its policy decisions.*

Press conferences and post-meeting statements are valuable tools for communicating broadly to the general public. However, it is also essential for the monetary policy committee to publish more detailed information about the rationale for its policy decisions. Such reports can be particularly helpful in ensuring that professional forecasters and financial market analysts have a clear understanding of the central bank's policy strategy, thereby reducing economic and financial uncertainty and facilitating the effectiveness of the monetary transmission mechanism. Such reports are also highly relevant for academic economists, who often play a key role in evaluating the central bank's policy framework and in contributing to its public accountability over time.

In particular, regular monetary policy reports can provide crucial information about the central bank's assessments of the economic outlook and the balance of risks. Such reports provide a means of discussing the specific details of economic and financial developments–and the methods used in analyzing those developments–that go well beyond the intrinsic limits of what can be communicated in a post-meeting statement or a press conference. Moreover, as noted above, monetary policy reports can present the implications of alternative scenarios that illuminate key risk-management issues.

From a practical standpoint, monetary policy reports are largely prepared by the central bank's staff. Consequently, such reports are typically viewed as effectively representing (either implicitly or explicitly) the views of the head of the monetary policy committee. However, such reports can also serve a valuable role in presenting the diversity of views of the entire committee. For example, the Bank of England's May 2014 *Inflation Report* frequently utilized phrases like "the central view of most MPC members" and "a range of views on the Committee."

7. Conclusions

Clarity and transparency of communications play a key role in enhancing the effectiveness of monetary policy and in sustaining the central bank's operational independence over time. In recent years, many central banks around the world have made significant improvements to the clarity of their communications. However, such communication will inevitably be a work-in-progress that requires continual effort and engagement with the public. Moreover, there are numerous dimensions of policy strategy and communication for which further research is warranted by economists at central banks and international organizations as well as at academic institutions.
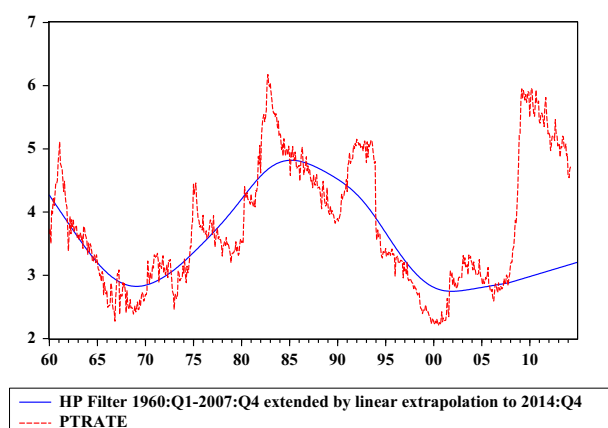
Fig. A1. Trend-cycle decomposition of U.S. involuntary part-time work.
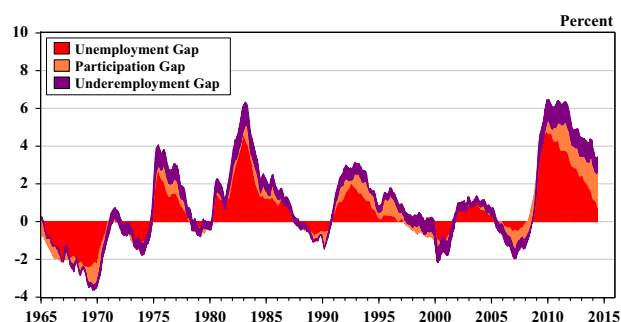

Fig. A2. The magnitude and composition of the U.S. employment gap since 1965.

Appendix A

This appendix describes the methodology used to construct each of the three components of the U.S. employment gap that are depicted in the lower panel of Fig. 7. The *unemployment gap* is the deviation of the civilian unemployment rate from the CBO (2014) assessment of the longer-run NAIRU, and the *participation gap* is the percent deviation of the actual labor force from the CBO (2014) assessment of the potential labor force.[38] The *underemployment gap* is defined as the number of full-time equivalent (FTE) jobs (expressed in proportion to the potential labor force) that would be required to eliminate the cyclical component of involuntary part-time work.

To construct the underemployment gap, the following three monthly time series were downloaded from the BLS website: (a) number of individuals working part-time for economic reasons (seasonally adjusted, BLS Identifier LNS12032194); (b) average hours per week of individuals working part-time for economic reasons (not seasonally adjusted, BLS Identifier LNU02033232); and (c) average hours per week of individuals who usually work full-time (seasonally adjusted, BLS Identifier LNS12505054). Henceforth these three series are denoted as *NINV*, *HINV*, and *HFULL*.[39] The relative shortfall in hours per week is given by $HRATIO = HINV/HFULL$.[40]

Next, the incidence of involuntary part-time employment was normalized by the potential labor force, i.e., $INVRT = 100*NINV/LFPOT$. The trend-cycle decomposition of *INVRT* was obtained by applying Eviews HP filtering algorithm over the sample period 1960:1 to 2007:12, where the smoothing parameter of 129,600 was determined by the Uhlig–Ravn formula. To project the trend beyond 2007, its monthly average change was computed for the period 2005:1 to 2007:12, and

---

[38] The CBO (2014) series were downloaded from http://www.cbo.gov/sites/default/files/cbofiles/attachments/KeyAssumptionsPotentialGDP.xlsx. Since the CBO (2014) series were published at an annual frequency, Eviews was used to interpolate each series to monthly frequency using the quadratic match average method.

[39] The Eviews X13 procedure was applied to *HINVOL*, since the BLS does not publish a seasonally adjusted version of that series.

[40] The BLS series on full-time hours is only available starting in 1994:1, and hence the mean value of 0.535 for *HRATIO* over the post-1994 sample was used in constructing the underemployment gap for all periods prior to 1994.

that slope (namely -0.0015) was used to extend the trend linearly from 2008:1 to 2014:4. The cyclical component $INVCYCLE = INVRT - INVTREND$; the resulting trend-cycle decomposition is shown in Fig. A1. Finally, the underemployment gap is obtained as $(1 - HRATIO) * INVOLCYCLE$.

Using these methods, Fig. A2 depicts the evolution of the magnitude and composition of the U.S. employment gap over the past five decades.

References

Aaronson, D., Davis, J., Hu, L., 2012. Explaining the Decline in the U.S. Labor Force Participation Rate. Chicago Fed Letter #296, Federal Reserve Bank of Chicago.

Alichi, A., Felman, J., Fernandez Corugedo, E., Laxton, D., Natal, J., April 2014. Anchoring inflation expectations when inflation is undershooting (Box 1.3). In: World Economic Outlook. International Monetary Fund, Washington DC, pp. 41–43.

Ball, L., Leigh, D., Loungani, P., 2013. Okun's Law: Fit at Fifty? National Bureau of Economic Research Working Paper #18668.

Beechey, M., Johannsen, B., Levin, A., 2011. Are inflation expectations more firmly anchored in the euro area than the US? Am. Econ. J.: Macroecon. 3, 104–129.

Bernanke, B., 2007. Monetary Policy Communications. Remarks delivered at the Cato Institute, November 14. Available at http://www.federalreserve.gov/newsevents/speech/bernanke20071114a.htm⟩.

Bernanke, B., 2010. Monetary Policy Objectives and Tools in a Low-Inflation Environment. Remarks delivered at the Federal Reserve Bank of Boston, October 15. Available at ⟨http://www.federalreserve.gov/newsevents/speech/bernanke20101015a.htm⟩.

Bernanke, B., 2013. Opening Remarks. Remarks delivered at Commemoration Ceremony for the Centennial of the Federal Reserve Act, December 16. Available at ⟨http://www.federalreserve.gov/newsevents/speech/bernanke20131216a.htm⟩.

Bernanke, B., Laubach, T., Mishkin, F., Posen, A., 1999. Inflation Targeting: Lessons from the International Experience. Princeton University Press, Princeton, New Jersey.

Blanchflower, D., Posen, A., 2014. Wages and Labor Market Slack: Making the Dual Mandate Operational. Peterson Institute for International Economics Policy Brief 14-10.

Blinder, A., Ehrmann, M., Fratzscher, M., DeHaan, J., Jansen, D., 2009. Central Bank communication and monetary policy: a survey of theory and evidence. J. Econ. Lit. 46, 910–945.

Carney, M., 2011. Renewing Canada's Monetary Policy Framework. Remarks given at the Board of Trade of Metropolitan Montreal, November 23. Available at ⟨http://www.bankofcanada.ca/2011/11/renewing-canada-monetary-policy-framework⟩.

Congressional Budget Office, 2014. The Budget and Economic Outlook: Fiscal Years 2014–2023, February.

Daly, M., Fernald, J., Jorda, O., Nechio, F., 2014. Labor Markets in the Global Financial Crisis: The Good, the Bad and the Ugly. Federal Reserve Bank of San Francisco Working Paper 2014-11.

D'Amico, S., Orphanides, A., 2008. Uncertainty and Disagreement in Economic Forecasting. Finance and Economic Discussion Series 2008-56, Board of Governors of the Federal Reserve System.

DePooter, M., Robitaille, P., Walker, I., Zdinak, M., 2014. Are long-term inflation expectations well anchored in Brazil, Chile, and Mexico? Int. J. Cent. Bank. 10, 337–400.

Eggertsson, G., Woodford, M., 2003. The zero interest-rate bound and optimal monetary policy. Brook. Pap. Econ. Act. 1, 139–211.

Erceg, C., Levin, A., 2003. Imperfect credibility and inflation persistence. J. Monet. Econ. 50, 915–944.

Erceg, C., Levin, A., 2013. Labor Force Participation and Monetary Policy in the Wake of the Great Recession. Centre for Economic Policy Research Discussion Paper 7921. (Also J. Money Credit Bank., forthcoming).

Evans, M., Wachtel, P., 1993. Inflation regimes and the sources of inflation uncertainty. J. Money Credit Bank. 25, 475–511.

Federal Open Market Committee, 2010–2014. Meeting Statements. Available at ⟨http://www.federalreserve.gov/newsevents/press/monetary⟩.

Federal Open Market Committee, 2014. Statement on Longer-Run Goals and Monetary Policy Strategy. Available at ⟨http://www.federalreserve.gov/monetarypolicy⟩.

Fernald, J., 2014. Productivity and Potential Output Before, During, and After the Great Recession. Federal Reserve Bank of San Francisco Working Paper 2014–15.

Furceri, D., Pescatori, A., April 2014. Perspectives on global real interest rates. In: World Economic Outlook. International Monetary Fund, Washington DC (Chapter 3).

Galati, G., Poelhekke, S., Zhou, C., 2011. Did the crisis affect inflation expectations? Int. J. Cent. Bank. 7, 167–207.

Gurkaynak, R., Levin, A., Swanson, E., 2010. Does inflation targeting anchor long-run inflation expectations: evidence from the US, UK, and Sweden. J. Eur. Econ. Assoc. 8, 1208–1242.

Gurkaynak, R., Sack, B., Swanson, E., 2005. Do actions speak louder than words? The response of asset prices to monetary policy actions and statements. Int. J. Cent. Bank. Available at ⟨http://www.ijcb.org/journal/ijcb05q2a2.htm⟩.

Gurkaynak, R., Levin, A., Marder, A., Swanson, E., 2006. Inflation targeting and the anchoring of inflation expectations in the Western Hemisphere. J. Econ. Chil. 9, 19–52.

Hornstein, A., Kudlyak, M., Lange, F., 2014. A New Measure of Resource Utilization in the Labor Market. Manuscript, Federal Reserve Bank of Richmond. Available at ⟨http://www.richmondfed.org/research/economists/bios/pdfs⟩.

Hotchkiss, J., Rios-Avila, F., 2013. Identifying factors behind the decline in the labor force participation rate. Bus. Econ. Res. 3, 257–275.

King, M., 2004. The New Inflation Target. Remarks given at the Annual Birmingham Forward CBI Business Luncheon, 20 January. Available at ⟨http://bankofengland.co.uk⟩.

Kohn, D., 2014. Federal Reserve Independence in the Aftermath of the Financial Crisis. Paper presented at Brookings Institution conference, January 16. Available at ⟨http://www.brookings.edu/research/papers/2014/01/16-federal-reserve-independence-financial-crisis-kohn⟩.

Levin, A., Natalucci, F., Piger, J., 2004. The macroeconomic effects of inflation targeting. Fed. Reserve Bank St. Louis Econ. Rev. 85, 51–80.

Levin, A., Taylor, J., 2013. Falling behind the curve: a positive analysis of stop–start monetary policies and the great inflation. In: Bordo, M., Orphanides, A. (Eds.), The Great Inflation, University of Chicago Press, Chicago, IL.

Matheson, T., Sandri, D., Simon, J., 2013. The dog that didn't bark: has inflation been muzzled or was it just sleeping? Int. Monet. Fund World Econ. Outlook 1, 1–17.

Meyer, L., 1996. Monetary Policy Objectives and Strategy. Remarks given at the National Assocation of Business Economists, September 8. Available at ⟨http://www.federalreserve.gov/boarddocs/speeches/1996/19960908.htm⟩.

Orphanides, A., Wilcox, D., 2002. The opportunistic approach to disinflation. Int. Finance 5, 47–71.

Orphanides, A., Williams, J., 2002. Robust monetary policy rules with unknown natural rates. Brook. Pap. Econ. Act. 1, 63–145.

Romer, C., Romer, D., 2014. Program Report: The NBER monetary economics program. Nat. Bur. Econ. Res. Report. 1, 1–7.

Sherk, J., 2012. Not looking for work: why labor force participation has fallen during the recession. Backgrounder 2777. Heritage Foundation Center for Data Analysis.

Stein, J., 2014. Challenges for Monetary Policy Communication. Remarks given at the Money Marketeers of New York University, May 6. Available at ⟨http://www.federalreserve.gov/newsevents/speech/stein20140506a.htm⟩.

Svensson, L., 2014. The possible unemployment cost of average inflation below a credible target. Am. Econ. J.: Macroecon., forthcoming.

Swanson, E., Williams, J., 2014. Measuring the Effect of the Zero Lower Bound on Medium- and Longer-Term Interest Rates. Federal Reserve Bank of San Francisco Working Paper 12-02. (Also Am. Econ. Rev., forthcoming).

Taylor, J., 1980. Aggregate dynamics and staggered contracts. J. Pol. Econ. 88, 1–23.

Taylor, J., 1993. Discretion versus policy rules in practice. Carn.-Roch. Conf. Ser. Pub. Pol. 39, 195–214.

Taylor, J., 1999. A historical analysis of monetary policy rules. In: Taylor, J. (Ed.), Monetary Policy Rules, University of Chicago Press, Chicago, IL.

Taylor, J., Williams, J., 2010. Simple and Robust Rules for Monetary Policy. Handbook of Monetary Economics.

Trichet, J., 2008. Introductory Statement with Q&A. Press Conference, European Central Bank, June 5. Available at ⟨https://www.ecb.europa.eu/press/pressconf/2008/html/is080605.en.html⟩.

Van Zandweghe, W., 2012. Interpreting the Recent Decline in Labor Force Participation. Economic Review, Federal Reserve Bank of Kansas City, pp. 5–34.

Woodford, Michael, 2003. Interest and Prices. Princeton University Press, Princeton, NJ.

Yellen, J., 2011. The Federal Reserve's Asset Purchase Program. Remarks given at the Brimmer Policy Forum, January 8. Available at ⟨http://www.federalreserve.gov/newsevents/speech/yellen20110108a.htm⟩.

Yellen, J., 2013. Communication in Monetary Policy. Remarks given at the Society of American Business Editors and Writers 50th Anniversary Conference, April 4. Available at ⟨http://www.federalreserve.gov/newsevents/speech/yellen20130404a.htm⟩.

Yellen, J., 2014. Monetary Policy and the Economic Recovery. Remarks given at the Economic Club of New York, April 16. Available at ⟨http://www.federalreserve.gov/newsevents/speech/yellen20140416a.htm⟩.