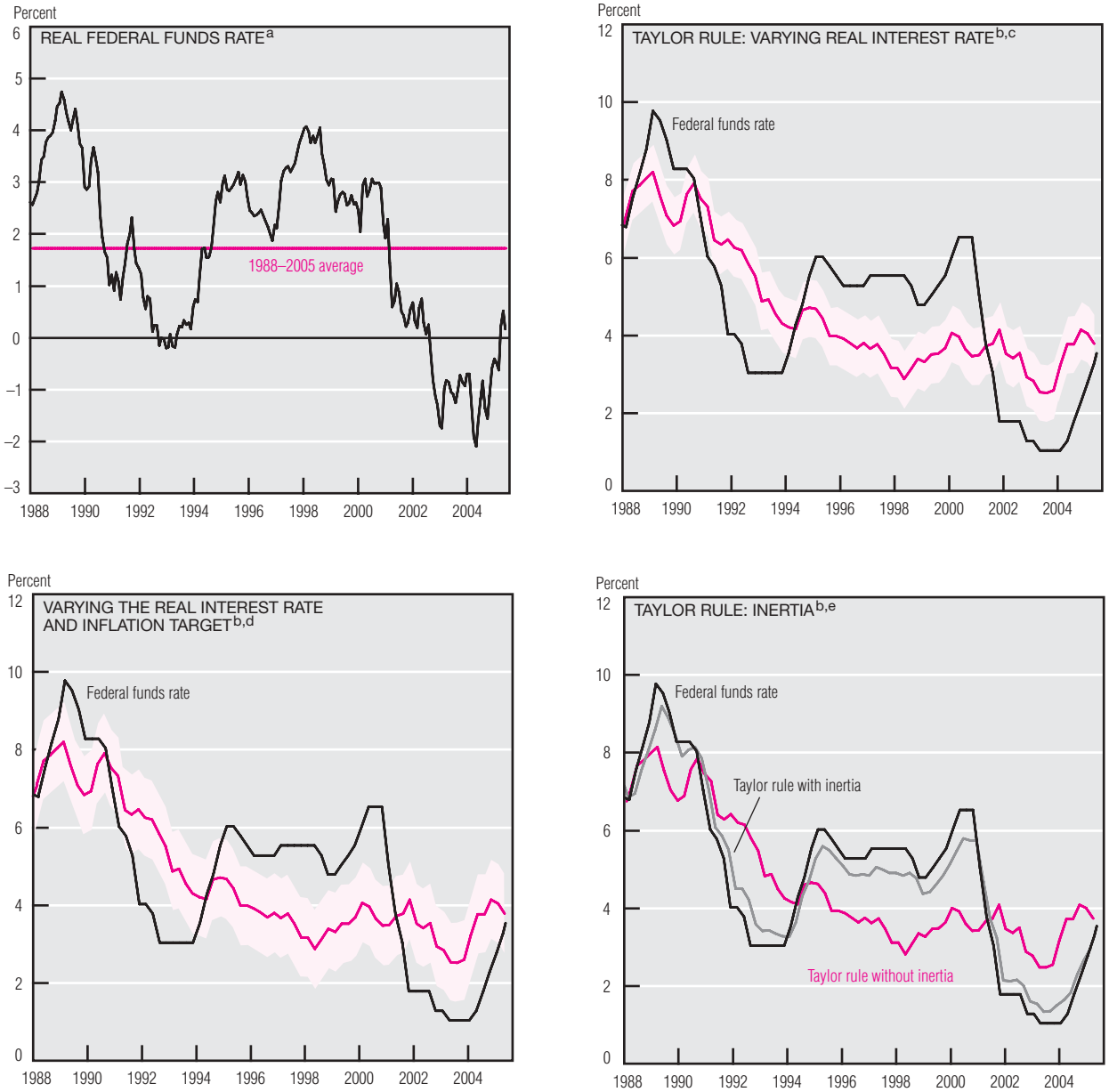
# Taylor Rules and Communication




a. Defined as the effective federal funds rate deflated by the Consumer Price Index.
b. The formula for the Taylor rule is from Sharon Kozicki, "How Useful Are Taylor Rules for Monetary Policy?" Federal Reserve Bank of Kansas City, *Economic Review*, 1999:IIQ. The baseline Taylor rule assumes the inflation target is 1.50% and the real interest rate is 1.75%.
c. The shaded band corresponds to an inflation target of 1.5%, with the real rate varying from 1% to 2.5%.
d. The shaded band corresponds to an inflation target varying from 1% to 2%, with the real rate varying from 1% to 2.5%.
e. The inertia component is 0.76.
SOURCES: U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Department of Labor, Bureau of Labor Statistics; and Board of Governors of the Federal Reserve System, "Selected Interest Rates," *Federal Reserve Statistical Releases*, H.15.

The FOMC statement continues to assert that "monetary policy remains accommodative," but it is difficult to judge whether or not this is the case. One approach is to calculate what the funds rate would have been in the past under similar conditions. The Taylor rule, which posits that the Federal Reserve sets the funds rate on the basis of inflation and the output gap (deviations of output from potential), provides such a benchmark.

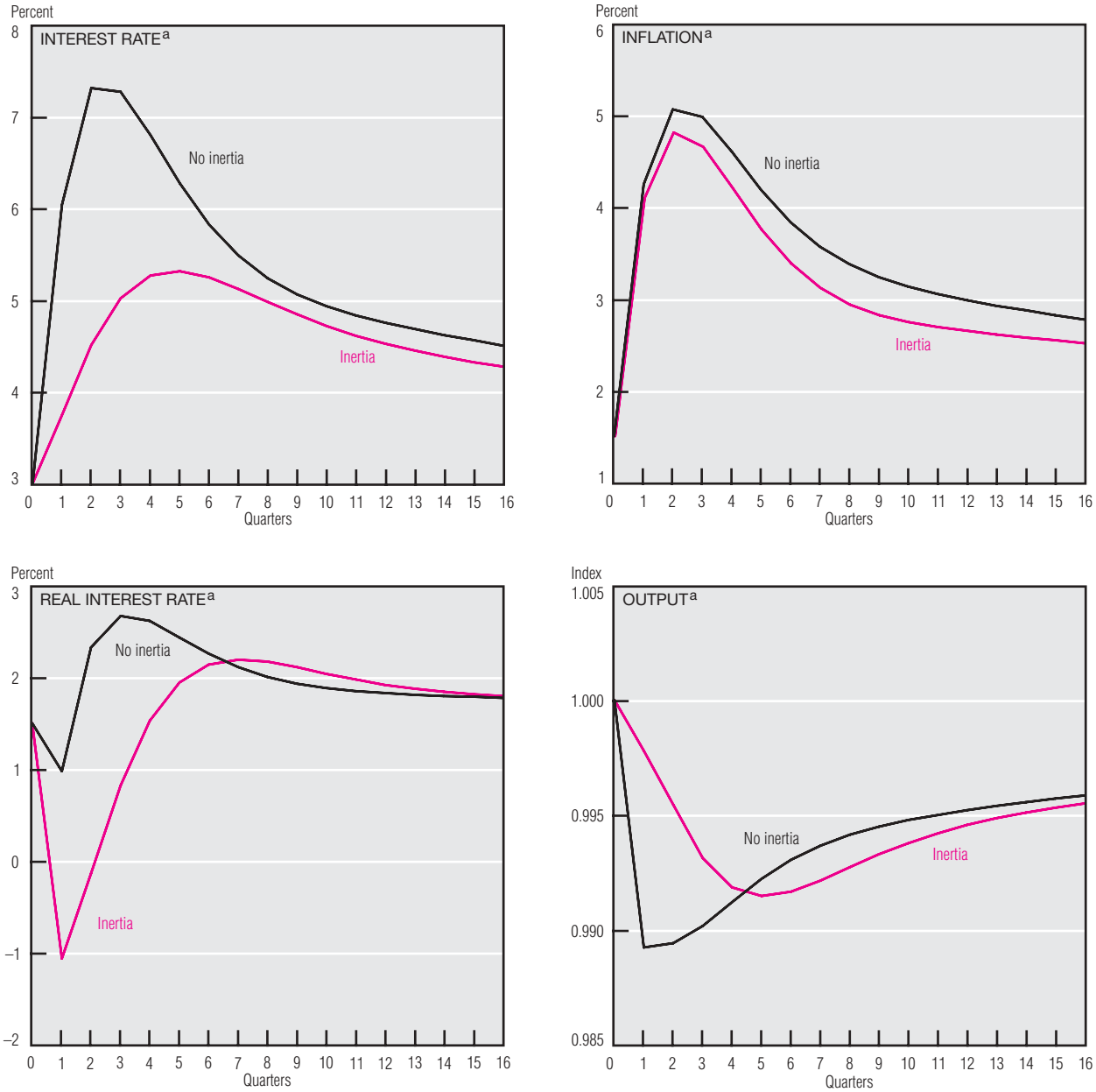
Unfortunately, calculating the Taylor rule also requires one's best guess on the Fed's (implicit) long-term inflation target and on the underlying long-term real funds rate, neither of which is observable. The short-term real funds rate varies substantially over time. Economic theory suggests that the underlying or long-term real funds rate may also vary. For example, it may be affected by both long-term productivity growth and monetary policy.

Since Chairman Greenspan took office, the real funds rate has averaged slightly less than 1.75%, but it could conceivably be as low as 1% or as high as 2.5%. This creates a band of uncertainly around the Taylor rule. The Fed's implicit long-term inflation target is likewise uncertain and plausibly ranges from 1% to 2%, creating another band of uncertainty.

The evidence suggests, however, that the Fed adjusts the funds rate more slowly than the Taylor rule predicts. Instead of adjusting immediately to the rate predicted by the Taylor rule, it appears to adjust only partially. This type of Taylor rule is called inertial because it changes slowly, and today's funds rate depends on yesterday's. Both the regular and the inertial

*(continued on next page)*

# Taylor Rules and Communication *(cont.)*




a. Simulations are hypothetical responses to a 30% oil price shock, given that future oil prices behave as they have in the past.
SOURCES: U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Department of Labor, Bureau of Labor Statistics; Board of Governors of the Federal Reserve System, "Selected Interest Rates," H.15, *Federal Reserve Statistical Releases*; and author's simulations.

Taylor rule suggest that the recent period of accommodation may have just about ended. According to history, whether the funds rate rises or falls from here depends on future inflation and output behavior.

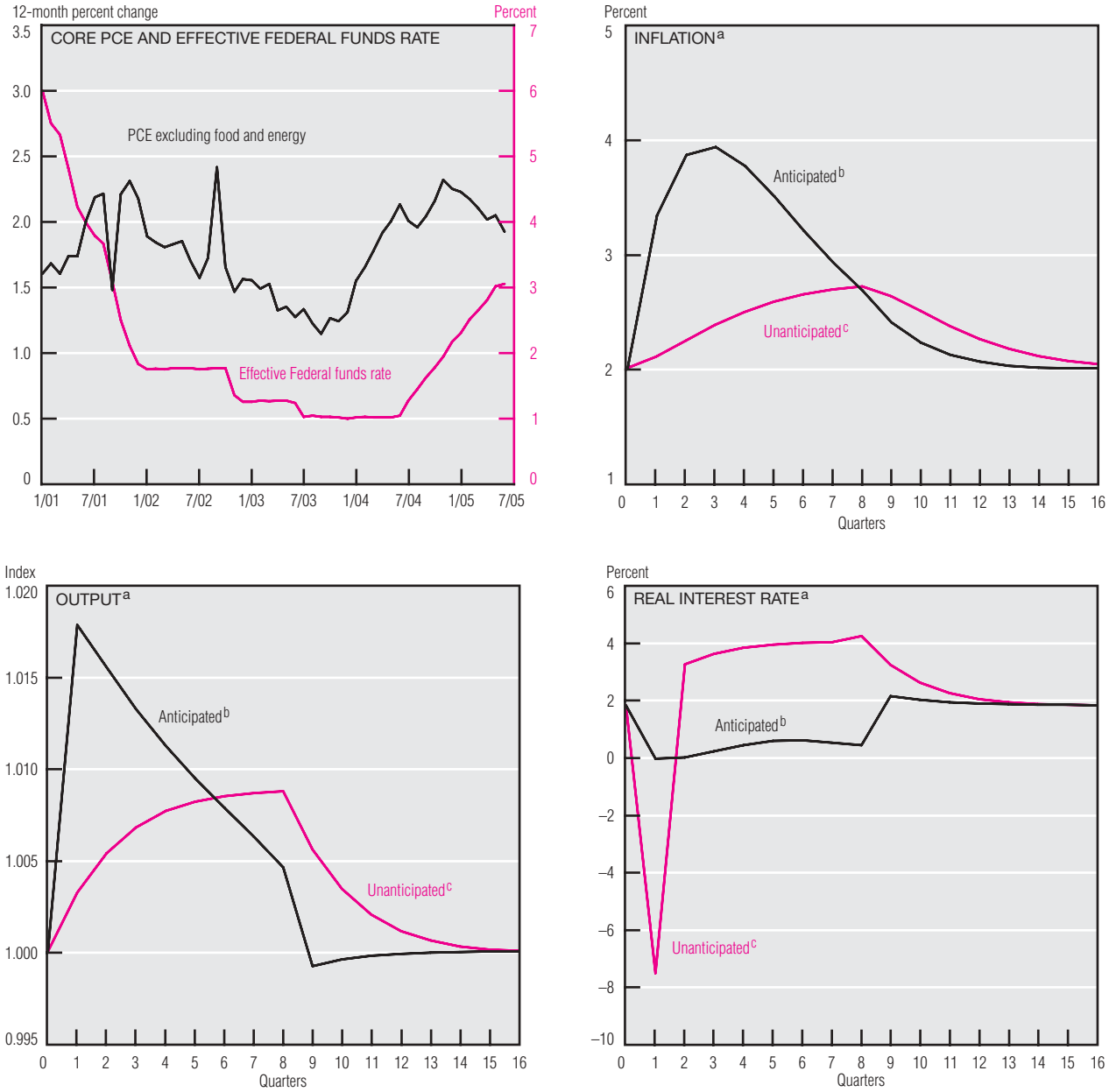
But why adjust only part way (that is, with inertia)? The funds rate increased 25 basis points at each of the last 10 policy meetings, instead of making five moves of 50 bp each. These moves were arguably predictable, given the unwinding of the earlier monetary stimulus and the unfolding of past energy shocks.

Model simulations suggest that there may be an advantage to adjusting the funds rate slowly. The following pictures answer a hypothetical question: Holding everything else constant, how would inflation, interest rates, and output be expected to behave after a one-time increase in oil prices? How would these variables behave if the Fed followed a non-inertial, rather than an inertial, Taylor rule?

With inertia, the nominal funds rate lags behind the non-inertial rule and peaks at a much lower level as well. Surprisingly, the funds rate with inertia is always lower than the non-inertial Taylor rule, yet inflation too is always lower. This is because the stance of monetary policy is not given by the nominal funds rate but by the real inflation-adjusted funds rate. In the quarters immediately following an oil price increase, policy is much easier (the real rate is lower) for the inertial rule, but in later quarters it is slightly tighter. A long period, sometime in the distant future, when policy is expected to be slightly tighter, more than compensates (in terms of inflation outcomes) for the shorter period when policy

*(continued on next page)*

# Taylor Rules and Communication (cont.)




a. Simulations are hypothetical responses to policy being kept 20 basis points below the inertial Taylor rule for eight quarters.
b. Anticipated implies that the public believes monetary policy will deviate from the Taylor rule for eight quarters.
c. Unanticipated implies that the public believes monetary policy will be conducted according to the Taylor rule, but the funds rate is unexpectedly kept low.
SOURCES: U.S. Department of Commerce, Bureau of Economic Analysis; U.S. Department of Labor, Bureau of Labor Statistics; Board of Governors of the Federal Reserve System, "Selected Interest Rates," H.15, *Federal Reserve Statistical Releases*; and author's simulations.

was substantially easier. Although inversely related, output's response closely mirrors movements in the real funds rate.

The Taylor rule with inertia clearly tracks the funds rate, but during some periods, the funds rate consistently deviated from both the normal and the inertial Taylor rule. Why might the Fed act differently than it has historically? The most recent period, when the funds rate was consistently below the inertial Taylor rule for more than two years, is an example.

Inflation had been falling since the beginning of 2001, reaching nearly 1% by mid-2003, and the Fed was concerned that there would be deflation if this trend continued. They responded by decreasing rates continually until June 25, 2003, when the funds rate reached an unprecedented 1%. Because interest rates cannot go negative, they were reluctant to further decrease the funds rate. This led to a fairly dramatic change in language starting with the August 2003 meeting, when the FOMC said that "the Committee believes that policy accommodation can be maintained for a considerable period." The goal was to condition expectations that the funds rate would remain low for a "considerable period."

Model simulations suggest the importance of such language. A funds rate that is expected to remain low has far more impact on inflation and output than a rate at which accommodation is expected to be gradually removed. Inflation and output grow more rapidly and are much larger when policy accommodation is anticipated. By influencing expectations, monetary policy operates through both short- and long-term rates.