



IS THE FED'S EXIT ON TRACK? ASSESSING THE INDICATORS

Peter Ireland¹

Boston College and Shadow Open Market Committee

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With the economic recovery continuing, slowly but surely, with unemployment abating, and with income and spending on the rise, talk has turned again to the Federal Reserve's exit, when it will begin to reverse the unprecedented policy actions taken in the years since 2008, first by tapering its enormous bond-buying programs and later, perhaps, by discussing more specifically the date at which the federal funds rate will lift off of its zero lower bound. As policy begins to change in these ways, how will we know that the Fed is not moving too quickly, putting the still-tentative expansion in jeopardy? And how will we know that the Fed isn't moving too slowly, falling behind the curve and allowing the economy to overheat? How can we be sure that, as they announce and implement what could very well be a complicated and delicate set of exit maneuvers, Federal Open Market Committee members will keep monetary policy on track, consistent with achieving their two percent long-run inflation objective? These are questions that monetary economists will recognize as ones that speak to the need for reliable indicators of monetary policy.

¹ I benefited greatly from conversations with Michael Belongia and Marvin Goodfriend while writing this paper, but retain full responsibility for all errors, omissions, and misstatements that remain.

Bennett McCallum (1990) defines carefully what the terms “instrument,” “goal,” “target,” and “indicator” mean in the context of an analytic framework for understanding how Federal Reserve policy actions filter through the financial system and affect the economy as a whole. Abbreviating his more detailed descriptions, a monetary policy instrument is a variable, like bank reserves, the monetary base, or perhaps the federal funds rate, that the Federal Reserve can directly and tightly control and that responds immediately to its policy actions.² Goal variables, by contrast, are only influenced -- not directly controlled -- by the Federal Reserve; they may, in addition, respond to monetary policy actions with a considerable lag. But goal variables are the ones that policymakers and by extension all Americans ultimately care about. The FOMC’s policy statements, for instance, often speak of the “statutory dual mandate,” prescribed by the Federal Reserve Act, of “fostering maximum employment and price stability,” thereby identifying unemployment and inflation as the Fed’s goal variables.

An intermediate target, as its name suggests, lies somewhere in between the instrument and the goals. It is a variable that is related to, but responds more quickly to policy actions than, the goal variables and can therefore be used as part of a two-stage policymaking process: By adjusting their chosen instrument in order to keep their intermediate target on a desired track, central bankers hope to achieve more reliably their objectives for the final goal variables. When in the mid-1970s, for example, Federal Reserve Chair Arthur Burns began presenting target ranges for the monetary aggregates in his periodic reports to the United States Congress, he

² Although most monetary economists, including McCallum (1990) himself, list the federal funds rate along with reserves and the monetary base as possible instruments of monetary policy, here I hedge just a little, in order to acknowledge that even when FOMC members describe their policy actions primarily with reference to changes in the funds rate, as they usually do, those movements in that market rate of interest do not come about through pure fiat, but must instead be supported by an appropriate set of open market operations that affect the supply of bank reserves first. See Ireland (2008, 2012) for further discussion of this point.

identified those measures of the money supply as intermediate targets, chosen to be consistent with the Fed's more fundamental objectives for unemployment and inflation.³

Within this same framework, indicator variables play a different role: They provide information, in real time, regarding the stance of monetary policy. Is the current setting for the federal funds rate, or the current growth rate of bank reserves, too high or too low to achieve a desired outcome for the goals? Reliable indicators are what Federal Reserve officials need in order to answer that question and thereby successfully implement their exit strategy. Likewise, outside observers of the Fed can use indicator variables to gauge whether the exit is going according to plan as well as to forecast, more generally, what effects the Federal Reserve's policy actions are likely to have on the economy as a whole.

Here, I'll consider three commonly used indicators of monetary policy -- interest rates, unemployment, and inflation -- before recommending a fourth, somewhat unconventional, choice of my own. To summarize briefly the conclusions, long-term interest rates have become a focal point for both Federal Reserve officials and observers of the Fed since 2008, while the federal funds rate itself has been locked up against its zero lower bound. Recent research in the area of financial economics, however, highlights that current and expected future monetary policy actions can affect long-term interest rates in complicated and counter-intuitive ways, making it difficult and dangerous to use them in judging whether policy is too loose or too tight. Unemployment and, especially, inflation are quite appropriately viewed as goal variables, but as real-time indicators of the stance of monetary policy, both are clearly deficient. By contrast, my own choice -- the monetary aggregates -- have consistently provided useful real-time signals about the stance of monetary policy and the future direction of output, employment, and inflation over the last ten years, a period during which their behavior has been largely ignored. In particular, a sharp deceleration in money growth beginning in 2005

³ Whether the Federal Reserve ever successfully implemented this policy strategy built around the monetary aggregates as intermediate targets is, of course, highly debatable; see Lang (1978), Broaddus and Goodfriend (1984), and Hetzel (2008) for descriptions, discussions, and analyses from a variety of perspectives.

presaged the economic slowdown in 2007 and the deep recession that followed in 2008. Continued sluggishness in money growth during 2010 and 2011 also helps explain recent the behavior of inflation, which for more than a year now has come in below the FOMC's two percent target. Most recently, however, key measures of the money supply have rebounded and stabilized, indicating the recovery is on more solid ground and that inflation is likely to move back towards target.

In making note of these facts, I am not arguing that monetary policy was the sole or even the principal cause of the Great Recession of 2008 and the anemic recovery that followed. And by emphasizing the usefulness of the monetary aggregates as indicators of monetary policy, I am not suggesting that the Fed return to a 1970s-style scheme according to which it would announce ranges for money growth as intermediate targets. But I am recommending that Federal Reserve officials and Fed watchers pay closer attention to measures of the money supply. For in both theory and practice, they provide valuable and timely information about what monetary policy is doing and where the economy is heading.

In any case, we all want to be ready to answer the question, "is the Fed's exit on track?" So let's assess each of the possible indicators, in more detail and in turn.

Interest Rates

With their federal funds rate target frozen at its lower bound of zero, Federal Reserve officials have experimented with a number of unconventional approaches to policymaking since 2008. Chairman Bernanke (2012) identified and discussed the most important of these in his speech at the Jackson Hole Symposium last year: "maturity extension," "forward guidance," and "large-scale asset purchases." Though different in their details, all of these new programs are designed to provide additional economic stimulus by lowering long-term interest rates. And, indeed, widely cited studies including Krishnamurthy and Vissing-Jorgensen (2011),

Gagnon, Raskin, Remache, and Sack (2011), and Campbell, Evans, Fisher, and Justiniano (2012) find that these programs have succeeded, at least to some extent, in generating lower yields on long-term bonds.

These findings raise the possibility that long-term interest rates, such as the yield on the ten-year US Treasury note, could serve as indicators for monetary policy as large-scale asset purchases wind down and forward guidance begins to focus on when the federal funds rate might be allowed to rise as opposed to the length of time over which it is expected to remain close to zero. Working from this perspective, one might conjecture that inflationary pressures will start to build if long-term interest rates remain too low for too long and, conversely, that a sharp and more immediate rise in long rates could choke off the recovery.

This idea has its merits. But two very recent and quite fascinating papers, one by Kitsul and Wright (2012) and the other by Fleckenstein, Longstaff, and Lustig (2013), give good reason to pause and reconsider. Both of these innovative studies use information contained in the prices of swaps and options to estimate the entire probability distribution, not just the expectation, of future inflation in the United States. Using logic provided by the modern theory of financial economics, which associates the “riskiness” of an asset not with the volatility of its return but with the covariance of that return, either with return on the market portfolio as in the famous capital asset pricing model of Sharpe (1964), Lintner (1965), and Mossin (1966), the rate of aggregate consumption growth as in Lucas’ (1978) version of the consumption-based CAPM, or what in the most general formulations used today, by Cochrane (2005), for instance, is referred to as the “stochastic discount factor,” these studies highlight a channel through which *lower* long-term interest rates reflect expectations of *tighter* monetary policy, exactly the opposite of what the conventional view implies.

This logic runs as follows. Derivatives prices reveal that market participants see a small, but non-negligible, probability that another severe, deflationary recession will occur in the United States. Because the real value of a nominal bond rises when the price level falls, conventional US Treasury bonds pay off exceptionally well during such “nightmare scenarios,” exactly when the market return is abysmally low,

consumption growth is painfully weak, and the stochastic discount factor is unusually large. Treasury bonds thereby offer valuable insurance against a deflationary recession, and as the probability of such an event has risen in recent years, investors have become willing to accept lower bond yields in exchange for more of that insurance.

Now, state-of-the-art models from finance like those used by Kitsul and Wright (2012) and Fleckenstein, Longstaff, and Lustig (2013) take the processes generating inflation and the stochastic discount factor as given: These are the primitives off of which all assets get priced. What monetary economists can add, to help deepen and extend the interpretation of these results, is the observation that from the central bank's perspective, inflation is certainly not a primitive to be taken as given. Instead, inflation is a goal variable that is heavily influenced, if not exactly controlled, by monetary policymakers. Put most bluntly, the Federal Reserve may not be able to offset the real effects of every shock that could send the American economy into recession in the years ahead. But the Federal Reserve certainly can prevent that recession from becoming worse by losing sight of its goals and allowing prices to decline persistently as they did, for example, during the Great Depression. A monetary economist can only conclude that long-term interest rates are low today in part because of growing fears that Federal Reserve policy will be inappropriately tight during a period of severe economic weakness. And long-term interest rates may fall lower still if, during a premature or rushed exit, Federal Reserve policy actually *does* become inappropriately tight in this way.

Overall, recent research on asset prices reminds us that long-term interest rates can be influenced by monetary policy in complicated and sometimes counter-intuitive ways. Of course, Milton Friedman (1968) said the same thing many years ago. And in his work with Anna Schwartz (1963*b*), Milton Friedman also taught us about the Great Depression, when everybody thought monetary policy was easy because interest rates were low but, really, interest rates were low because monetary policy was so tight. Recent research underscores that this is no historical curiosity or one-time joke. It could happen again and bond traders instinctively know

it. The message to us is clear: Interest rates are sometimes helpful, but should be used with great caution as indicators of monetary policy.

Unemployment

Instead of interest rates, the unemployment rate might serve as a good indicator of monetary policy. In fact, the Federal Open Market Committee has encouraged us to think in this way, by tying, through its strategy of forward guidance, the future path for the funds rate to changes in unemployment. If, as the FOMC says now, interest rates of zero are appropriate until unemployment reaches 6 1/2 percent, then looking farther ahead, one might also say that interest rates should rise more quickly or slowly depending on the speed with which unemployment falls further after that.

Once again, Milton Friedman (1968) cautioned us against this way of thinking. To be fair, the FOMC has been careful to couch its forward-looking statements in terms of both unemployment and inflation, thereby hedging against the possibility of an adverse shift to the Phillips curve. All the same, an hour or two spent reading Hetzel's (2008) vivid -- and often cringe-inducing -- account of the "stop-go" era of the 1960s and 1970s, when policymakers persisted in their attempts to push the unemployment rate lower, dismissing any rise in inflation as attributable to transitory "cost-push" factors, will suffice to make anyone feel grossly uneasy about an analytic framework that places so much emphasis on unemployment in judging whether monetary policy is too easy or too tight.

It is not that monetary policy cannot affect the unemployment rate. To the contrary, it can. Nor it is the case that Federal Reserve policymakers should not care about unemployment. To the contrary, they should. It is simply that the unemployment rate is buffeted about by too many other factors to make it of much use in gauging the stance of monetary policy. That was true in the 1960s and 1970s, but it is equally if not more true today, especially in light of the longer-run trends in labor force participation discussed by microeconomists

such as Moffitt (2012) and macroeconomists such as Stock and Watson (2012). These trends are difficult to separate from purely cyclical movements, and their fundamental sources are not yet well understood. The resulting uncertainty about the natural rate of unemployment is precisely what makes the inflation-targeting strategies described, for instance, by Bernanke, Laubach, Mishkin, and Posen (1999) ideal for stabilizing *both* inflation and unemployment. It is why the FOMC's own adoption, in January of last year, of a two percent inflation target represented such an important step forward in helping it achieve both sides of its dual mandate and in informing the American public of what monetary policy can and cannot reasonably do. And it is why the unemployment rate, by itself, cannot serve as a reliable indicator of monetary policy either.

Inflation

Ultimately, examining the behavior of prices or inflation, their rate of change, provides the only sound basis for evaluating Federal Reserve policy. As noted above, the Fed cannot possibly insulate the economy against all possible shocks, prevent every recession, and ameliorate every uptick in the unemployment rate. But everything we've learned about monetary policy, from David Hume (1777) through Milton Friedman (1968) through Bernanke, Laubach, Mishkin, and Posen (1999) down to the present day, assures us that the Fed can deliver on its promise of two percent inflation over the long-term by acting consistently to keep price increases within a narrow range of that target. Inflation itself might therefore be not just a goal variable but also an indicator of monetary policy, providing evidence of whether monetary policy is too easy or too tight. Thinking along these lines, FOMC members seem quite justified, for example, in their recent expressions of concern about inflation, which for more than a year now has remained below their two percent target.

A problem with using inflation as a *real-time* indicator of monetary policy, however, has to do with the long lag with which policy actions affect prices, especially in low-inflation environments. Friedman (1968) took special note of this problem, and Reynard (2012) finds that it persists: Several years can elapse before

changes in Federal Reserve policy reflect themselves fully in the behavior of prices. Thus, the low inflation we see now more likely reflects restrictive monetary conditions that prevailed in 2009 through 2011 than tight money today.

With this long lag in mind, Friedman (1968) recommended keeping inflation as a goal variable for monetary policy and using money growth as an indicator. Friedman's ideas, particularly those emphasizing the usefulness of money growth, were not very popular then. And, to be honest, they are probably even less popular today: Who amongst us even thinks, let alone talks or writes, about M1 and M2 anymore?⁴ Yet, for the same reasons that Friedman did, I recommend listening carefully to the messages these monetary aggregates provide as indicators of Federal Reserve policy.

Monetary Aggregates

The graph at the end of this paper highlights just how useful the monetary aggregates have been, recently, in signaling the stance of monetary policy in real time.⁵ The four panels show the business-cycle components of various measures of the money supply, computed using the Hodrick-Prescott (1997) filter, which for these purposes can be viewed as providing the modern-day analogs to the reference-cycle methods that Friedman and Schwartz (1963*a*) borrowed from Burns and Mitchell (1946) in their own statistical analysis of money and the business cycle. In particular, the Federal Reserve's official M1 and M2 measures are shown, together with their Divisia counterparts constructed by William Barnett and his associates at the Center for Financial Stability in New York City. Rather than simply adding up the values of funds held in various types of bank accounts, as the Federal Reserve's measures do, the Divisia aggregates draw on methods, outlined by Barnett

⁴ Ed Nelson has been one notable exception; see, for example, Nelson (2003).

⁵ Belongia and Ireland (2013) analyze the data shown in these graphs in much more detail, interpreting the relation between movements in money and subsequent movements in output and prices using a structural vector autoregressive time series model of the kind originally developed by Bernanke (1986), Blanchard and Watson (1986), and Sims (1986).

(1980), that explicitly recognize, for instance, that a dollar held in a NOW account is more liquid -- and can therefore be said to provide a larger flow of “monetary services” -- than the same dollar held in a three-month CD. Quite helpfully, too, the CFS aggregates also adjust the Federal Reserve’s official measures to remove the distortionary statistical effects of computerized problems that most banks now use to invisibly “sweep” funds on deposit in customers’ checking accounts into savings accounts for the purpose of minimizing statutory reserves requirements.⁶

Despite some differences in the behavior of the four series, a number of general conclusions can be drawn from their movements:

- 1) The monetary aggregates do seem to anticipate subsequent movements in output and prices in a manner that is fully consistent with traditional accounts of monetary policy and its effects, including those provided by David Hume (1777) and Friedman and Schwartz (1963*a*). Monetary policy, as reflected in the behavior of the Divisia M1 aggregate, moved unrelentingly from accommodation to tightness in the years from 2005 through 2008. The economy weakened and then fell into a deep, deflationary recession. Monetary constraint continued through mid-2011, foreshadowing the tepid recovery and slow inflation that we are seeing now.
- 2) None of the graphs in this picture supports the popular view that monetary policy has been consistently and excessively accommodative since 2008. To the contrary, focusing on money growth as an indicator, policy seems to have been more often a source of deflationary impulses, quite similar to those that give rise to the asset-price dynamics detected by Kitsul and Wright (2012) and Fleckenstein, Longstaff, and Lustig (2013).

⁶ For a more complete discussion of the measurement issues raised by sweep programs, see Cynamon, Dutkowsky, and Jones (2006). Alternative series for the Divisia monetary aggregates that adjust, as well, for the effects of sweep programs have been compiled by Richard Anderson and Barry Jones at the Federal Reserve Bank of St. Louis. For more information about these series on Divisia and sweep-adjusted money and the differences between them, see Anderson and Jones (2011) and Barnett, Liu, Mattson, and van den Noort (2013).

- 3) The enormous expansion the bank reserves since 2008 has, for the most part, not translated into rapid growth in the broader monetary aggregates. Indeed, the shaded periods in each graph, marking the three waves of large-scale asset purchases known popularly as “quantitative easing,” seem at best only loosely connected with sustained movements in money growth. Divisia M1 rose, but then fell just as sharply, during QE1, increased substantially, but only in the final months, of QE2, and has remained essentially flat during QE3. One reason for this may be that the Federal Reserve has been paying interest on reserves at a rate that, though small, nevertheless exceeds the rate that banks can earn on comparable risk-free assets like Treasury bills. As shown by Ireland (2013), policies that pay interest on reserves are best viewed as acting on the *demand* for reserves, so QE1 through QE3 may have been necessary simply to accommodate this increase in the demand for reserves with a corresponding increase in supply. Another reason might be that, by focusing so heavily on the behavior of long-term interest rates, the Federal Reserve has neglected to consider, and exploit, the traditional channels linking well-designed open market operations to changes in money growth, which can then give rise to changes in output and inflation.
- 4) Money growth has recovered since the middle of 2011, suggesting that monetary policy is finally lending support to the economic recovery. So long as this growth in the monetary aggregates continues, we should expect to start seeing a movement in inflation back towards the Fed’s two percent target, with further gains in employment, income, and spending as well.
- 5) From here, however, any marked acceleration or deceleration of growth in the monetary aggregates ought to be taken seriously, as a warning sign that the Federal Reserve’s exit has gone off track.

Postscript: Measurement Does Matter

One final question concerns measurement: Which of the four monetary aggregates shown in the figure is likely to be most useful as an indicator of monetary policy, going forward? William Barnett (1980) showed more

than thirty years ago that the standard, simple-sum approach to monetary aggregate makes no sense. Just as no one would take seriously a measure of real economic activity that assigned equal weight to each good produced -- adding apples and oranges or, worse yet, adding apples, oranges, luxury automobiles, and aircraft carriers -- so, too, no one should rely on a monetary aggregate that assigns equal weight to a dollar held as currency and the same dollar held in a three-month time deposit. Despite their fancy and foreign-sounding name, the Divisia monetary aggregates -- call them “appropriately-weighted measures of money,” if you prefer -- proposed by Barnett simply apply the same, value-weighted scheme to monetary aggregation that national income accountants use to measure real GDP.

In the figure, one can see that in recent years, the Federal Reserve’s official, simple-sum aggregates and Barnett’s preferred, Divisia counterparts, have behaved similarly. Yet that has not always been the case. In the early 1980s, for example, Milton Friedman forecast a return to high inflation based on observations of very rapid growth in simple-sum M1, a rare misstep that, Barnett (2012) notes, he might have avoided if he had been looking at the Divisia measure instead. Likewise, Belongia and Ireland (2013) show that when Divisia measures of the money supply are used in place of the Federal Reserve’s official simple-sum aggregates, strong statistical links between movements in Divisia measures of money and subsequent changes in output and prices can be found in data spanning the Great Inflation of the 1970s, the Great Moderation of the 1980s and 1990s, and the Great Recession of 2008. It is clear that economists owe a debt of gratitude to Barnett, and to Richard Anderson and Barry Jones, for their careful work in adjusting the official measures of the money supply. Less clear is why the Federal Reserve cannot or will not simply make those adjustments to the official statistics themselves.

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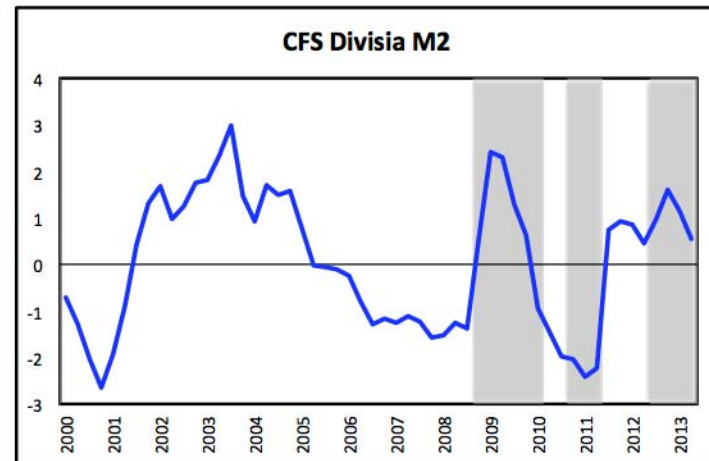
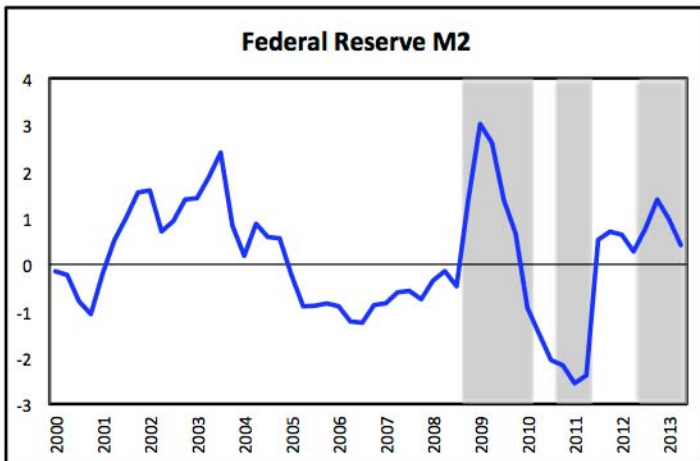
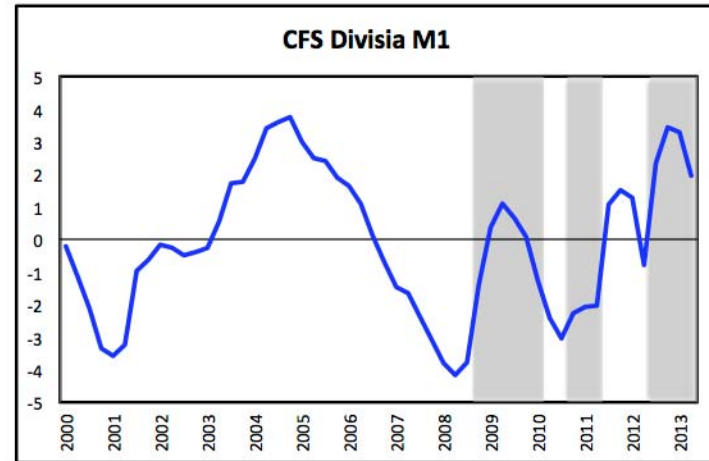
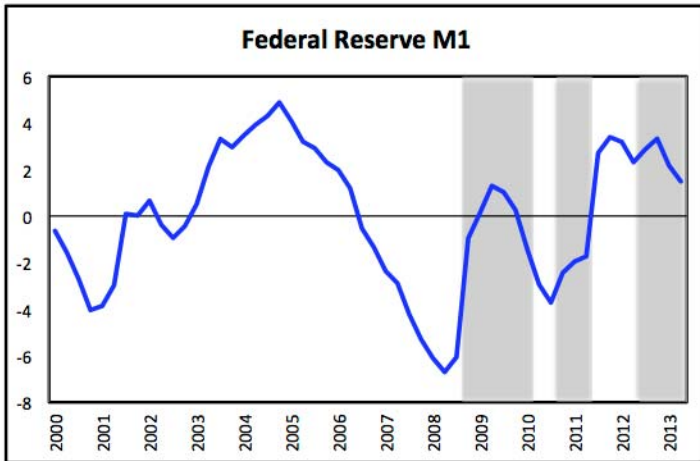
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Cyclical components of monetary aggregates, computed with the Hodrick-Prescott filter. Units indicate percentage deviations from trend. Shaded areas indicate episodes of quantitative easing.