Comment on 'Using a Long-Term Interest Rate as the Monetary Policy Instrument'*

Michael Woodford
Columbia University

April 18, 2005

Abstract

The use of a long-term interest rate as the instrument of monetary policy would not have the advantage, sometimes claimed for it, of relaxing the constraint on what can be achieved by monetary policy when the zero lower bound on short-term interest rates is reached. The proposal would also seem an impractical one to implement.

*I would like to thank Gauti Eggertsson, Eduardo Loyo and Paul Tucker for helpful discussions of the issues raised in this paper.

McGough *et al.* (2005) entertain the proposal that the Fed might use a long-term bond rate as the instrument of monetary policy, rather than the federal funds rate as at present. It is not entirely clear what such a proposal would imply in practice; but at the very least, it would mean that the Fed would have a view at each point of time regarding the appropriate level of bond prices (given other economic conditions at the time), and would use the means at its disposal to seek to bring bond prices in line with this view. Most of the paper is concerned more specifically with an analysis of the properties of Taylor-type rules for monetary policy, in which an operating target for a longer-term interest rate (rather than a very short rate, as in Taylor's original formulation) is a linear function of current inflation.

The idea that the Fed might wish to target a long bond yield, and perhaps even directly intervene in the market for Treasuries to achieve such a target, was discussed a great deal in early 2003, as the federal funds rate fell to a historically low level.[1] It was proposed that intervention to lower long rates could provide a possible source of additional monetary stimulus that would not require further reductions in the current level of overnight interest rates. Similar proposals have often been urged upon the Bank of Japan in recent years, where deflation continues despite an overnight rate that has essentially been equal to zero for several years. It is therefore of particular interest to ask whether a policy that targets a long bond yield would lead to improved outcomes in the case of an economy where the zero lower bound on interest rates becomes a binding constraint on what can be done with a short-term policy instrument such as the federal funds rate.

[1] Bernanke (2002) was one of the first to raise this possibility.

1 Would a Long-Rate Instrument Increase the Set of Possible Equilibrium Outcomes?

The idea that use of a long rate as the instrument of policy would would allow greater scope for effective monetary policy under at least certain circumstances, when the room for further stimulus using an overnight-rate instrument is constrained, seems to presume that there is a set of outcomes that would *not* be attainable using the overnight-rate instrument, because they would require the overnight rate to be negative, but that would nonetheless be attainable using a long-rate instrument. The argument usually given is that long rates are observed still to be positive even when (as in Japan in recent years) overnight rates have already hit the zero bound; under such circumstances, it is argued, there is no further possibility of stimulus using the overnight-rate instrument, while it would evidently still be possible to stimulate the economy by lowering long rates.

But the constraint on the possible equilibrium paths of inflation and output owing to the existence of a zero lower bound on nominal interest rates, derived in papers such as Eggertsson and Woodford (2003), has nothing to do with the assumed use of a short-term interest rate as the instrument of policy. A given state-contingent evolution of the economy implies a particular path for the short-term nominal interest rate; and this must be non-negative at all times. A well-defined, and non-negative, equilibrium short-term interest rate must exist even when a long rate is used as the policy instrument, and the constraint on the set of possible equilibria remains the same.

Moreover, the zero lower bound for short rates implies a lower bound for long rates as well, given expectations about the future conduct of policy. And when it is expected that policy will be conducted in the future in a way that implies that short rates will not be zero in all states of the world, the implied lower bound on long rates can be higher than zero, as illustrated by equation (2.9) below. Thus the mere existence of a positive long rate need not imply the possibility of further stimulus through open market operations, including open-market purchases of long-maturity bonds. Once short rates have fallen to zero, Eggertsson and Woodford (2003) show that open-market operations have no effect on long *or* short rates (or on inflation or real activity, either),

if the open-market operations do not imply any change in the rule according to which policy is expected to be conducted in the future. Committing to an alternative future approach to monetary policy *can* stimulate the economy, even when short-term interest rates are zero; but that is possible even in the case that the instrument of policy is an overnight rate.

2 Is a Long-Rate Instrument a Substitute for History-Dependent Short-Rate Policy?

The authors' discussion states clearly that they do not assume that adjustment of a long-rate instrument can accomplish anything that could not also be accomplished through a corresponding adjustment of expectations regarding the future path of short rates. However, they propose that adjustment of an operating target for a long bond rate might be a more practical way of achieving the desired equilibrium (along with the associated expectations) than directly making commitments regarding the future conduct of policy.

One reason to suppose that this might be the case is that the kind of policy commitment recommended by authors such as Eggertsson and Woodford (2003) in order to deal with a binding zero lower bound on short-term interest rates involves committing to adjust short rates later in a *history-dependent* way, *i.e.*, in a way that depends on the degree to which the zero bound had previously constrained policy, and not simply on the degree to which it is possible to achieve the central bank's stabilization objectives at the later date. It might seem implausible that the private sector should expect policy to be conducted later in a history-dependent way, just because the central bank might earlier have claimed that it intended to do so. The proposal instead to act to lower long rates while the economy is still in the "liquidity trap" might seem to avoid the need for history-dependent policy; one lowers long rates at a time when additional stimulus is obviously needed, not at a time when it is no longer needed. Indeed, the long-rate policy rules considered in the paper are purely forward-looking: the long-rate operating target is a function only of states that are relevant for inflation and output determination now and in the future.

But the use of a long-rate operating target will be of no help in relaxing the constraint associated with the zero lower bound on interest rates, as long as the policy rule is still purely forward-looking. This can be illustrated by recapitulating some of the analysis of Eggertsson and Woodford, in the context of a log-linear "New Keynesian" model like the one used in this paper, but imposing the zero lower bound on short-term nominal rates. Output and inflation are determined by the two equations

$$x_t = E_t x_{t+1} - \sigma(i_t - E_t \pi_{t+1} - r_t^n), \tag{2.1}$$

$$\pi_t = \kappa x_t + \beta E_t \pi_{t+1}, \tag{2.2}$$

while the one-period riskless nominal rate i_t must satisfy

$$i_t \geq 0 \tag{2.3}$$

at all times. Here r_t^n is the exogenously varying natural rate of interest. Longer-term interest rates are related to short rates through the term-structure equation

$$i_{n,t} = \left(\sum_{j=0}^{n-1} \delta^j \right)^{-1} \sum_{j=0}^{n-1} \delta^j E_t i_{t+j}. \tag{2.4}$$

It is assumed that policymakers would like, if possible, to stabilize both inflation π_t and the output gap x_t around zero; according to equations (2.1) – (2.3), an equilibrium exists in which both goals are fully achieved, as long as the natural rate of interest is always non-negative. But in the scenario considered by Eggertsson and Woodford, the natural rate of interest is temporarily negative. Specifically, suppose that r_t^n drops unexpectedly to $\underline{r} < 0$ in period zero. Thereafter, there is a probability $0 < p < 1$ each period of permanent reversion to normal level, $\bar{r} = \beta^{-1} - 1 > 0$.

Let us first consider what would happen in the case that policy is conducted in accordance with a Taylor-type rule

$$i_t = \max\{\bar{r} + \gamma \pi_t,\ 0\}, \tag{2.5}$$

for some $\gamma > 1$. The rule is modified, relative to the formulation given in the present paper, to reflect the fact that the interest-rate operating target

cannot ever be negative. (Note that this simple rule would be consistent with the optimal equilibrium, if r_t^n were never negative.)

In the case of the disturbance process assumed, the unique non-explosive rational-expectations equilibrium is easily computed. Once $r_t^n = \bar{r}$ again, $\pi_t = x_t = 0$ at all times, and $i_t = \bar{r} > 0$. On the other hand, while $r_t^n = \underline{r} < 0$,

$$\pi_t = \underline{\pi}, \qquad x_t = \underline{x}, \qquad i_t = \underline{i},$$

where $\underline{\pi}$, $\underline{x}$, and $\underline{i}$ satisfy

$$\underline{x} = (1-p)\underline{x} + \sigma[\underline{r} + (1-p)\underline{\pi} - \underline{i}], \tag{2.6}$$

$$\underline{\pi} = \kappa\underline{x} + \beta(1-p)\underline{\pi}, \tag{2.7}$$

$$\underline{i} = \max\{0, \bar{r} + \gamma\underline{\pi}\}. \tag{2.8}$$

The least contractionary equilibrium (meaning the least negative values for $\underline{\pi}, \underline{x}$) occurs if γ is large enough for the zero bound to bind when $r_t^n = \underline{r}$, so that $\underline{i} = 0$. (This is obviously the best kind of policy in this class, given the assumed stabilization objectives.) The solution in this case is given by

$$\underline{\pi} = \frac{\underline{r}}{(\kappa\sigma)^{-1}p[1-\beta(1-p)] - (1-p)}, \qquad \underline{x} = \frac{1-\beta(1-p)}{\kappa}\underline{\pi}.$$

Note that deflation and output contraction may be very severe while the zero bound binds, even for only a modestly negative value of $\underline{r}$.

Now consider what happens if we assume the same kind of policy rule, but with a two-period interest rate as the policy instrument, so that

$$i_{2,t} = \max\left\{\bar{r} + \theta_2\pi_t, \ \frac{\delta}{1+\delta}E_t i_{t+1}\right\} \tag{2.9}$$

for some $\theta_2 > 1$. Here the lower bound is the lower bound for $i_{2,t}$ consistent with (2.3), given (2.4). Once again, there is a determinate equilibrium with zero inflation when the lower bound does not bind; so again, $\pi_t = x_t = 0, i_t = i_{m,t} = \bar{r}$ at all times, once $r_t^n = \bar{r}$. Similarly, when $r_t^n = \underline{r} < 0$, $\pi_t = \underline{\pi}$, $x_t = \underline{x}$, and $i_t = \underline{i}$, where $\underline{\pi}$, $\underline{x}$, $\underline{i}$ satisfy (2.6)–(2.7) as above, but (2.8) is replaced by

$$\begin{aligned}\frac{1}{1+\delta}\{\underline{i} + \delta[p\bar{r} + (1-p)\underline{i}]\} \quad &= \\ \max\{\frac{\delta}{1+\delta}[p\bar{r} + (1-p)\underline{i}], \qquad &\bar{r} + \theta_2\underline{\pi}\}.\end{aligned} \tag{2.10}$$

Equation (2.10) can equivalently be written

$$\underline{i} = \max\{0,\ \bar{r} + \Gamma(\theta_2)\underline{\pi}\},$$

where

$$\Gamma(\theta_2) \equiv \frac{1+\delta}{1+\delta(1-p)}\theta_2.$$

Thus the equilibrium is *the same* as under a rule of the form (2.5) with $\gamma = \Gamma(\theta_2)$. So rules of the form (2.9) can achieve no improvement upon the (possibly very bad) equilibrium described above in the case of the simple Taylor rule. The same can easily be shown in the case of equally forward-looking rules in which the instrument is an even longer-maturity bond rate.

Eggertsson and Woodford (2003) show instead that one *can* greatly improve upon the bad equilibrium, through commitment to a *history-dependent* short-rate policy. The problem with the simple Taylor rule is that it is purely forward-looking, and so implies immediate reversion to the zero-inflation (optimal) steady state once r_t^n reverts permanently to a positive level; but the anticipation of this makes the deflation and contraction severe during the period when the natural rate of interest is mildly negative. Because the long-rate rule (2.9) is still a purely forward-looking policy, it does nothing to cure this problem. Thus use of a long rate as the instrument of policy is *not* a substitute for committing the future path of short rates in the way discussed by Eggertsson and Woodford.[2]

3 Further Considerations on the Suitability of a Long Rate as a Policy Instrument

There are further reasons for doubting the suitability of choosing a long-term interest rate as the instrument of policy, rather than the federal funds rate. Presumably, such a proposal would require the FOMC to choose an operating target for (say) the 10-year Treasury bond rate at each meeting, and instead let the markets determine what this would imply for the level of the funds

[2]Similar comments apply to the proposal by Svensson (2003) that the exchange rate be used as the instrument of policy when an economy is in a "liquidity trap."

rate. The Trading Desk of the New York Fed would then be instructed to make trades each day of a sort intended to keep that particular bond yield as close as possible to the current target level.

What would be the consequences of seriously attempting such a thing? Let us suppose, for the sake of argument, that the Trading Desk would be able to keep the 10-year bond rate close to the target through suitable open-market operations each day. If so, then the 10-year rate would be kept nearly constant between FOMC meetings (since, except under rare circumstances, the target would change only on those dates); but it would move in discrete jumps on meeting dates. Furthermore, those jumps on meeting dates would often be *predictable* in advance of the meeting date, with a fair degree of confidence, just as funds rate target changes currently are. (Certainly, if the long-rate target were determined by a Taylor rule, as hypothesized in this paper, bond traders would have a considerable ability to anticipate target changes well in advance of the meeting.)

But a forecastable change in 10-year bond rate from one day to the next would imply a very large spike in overnight rates on the day before the new target takes effect (again, assuming that the Fed could actually keep the bond rate near the target on a daily basis), given the extremely large one-day capital gain or loss that that would be expected by holders of 10-year bonds. But such extraordinary movements in short rates would surely be an undesirable effect of this approach to monetary control.

Indeed, something of the kind has been observed under the recent operating procedures of the Bank of England, where the policy decision of the Monetary Policy Committee each month has been to announce an official repo rate, at which the Bank would conduct repurchase operations in Treasury bills with a two-week maturity. When these repurchase operations span a meeting date of the MPC, they continue to be conducted at the current official rate, even when it is possible for the markets to anticipate that the rate will be changed at the upcoming meeting. According to Tucker (2004, p. 8), "arbitrage tends to make expected overnight rates over the relevant two-week period equal to the rate at which the Bank lends in its operations," while at the same time the expected level of overnight rates over the two-week period beginning with the meeting date (which overlaps with the first two-

week period) will be different. As a result, "when the MPC is expected to change rates, the ultra-short maturity rate structure 'pivots' in a rather perverse way." This consequence of the Bank of England's procedures is cited by Tucker as among the primary motivations for a proposed change in operating procedures, to ones that would make the policy rate an operating target for the overnight rate – and thus, that would make the overnight rate the *instrument* of monetary policy in the U.K. – as is already the case in countries like the U.S. But the problem of "pivoting" encountered by the Bank of England would surely be much more severe in the case of an operating target for a rate with a maturity much longer than two weeks.

In fact, it is implausible to suppose that the Fed would be able to keep long bond rates near the current operating target at times when the bond market would confidently expect that target rate to be changed at an upcoming meeting of the FOMC. It would be impossible for this to be achieved on the day before an expected increase of even one basis point in the 10-year bond rate target. For (under the assumption, say, of a normal 10-year bond rate of 5 percent), such an increase would lower the price of a 10-year bond by about 0.08 percent; and this size of anticipated capital loss from one day to the next[3] would mean that no one would be willing to hold 10-year bonds on the day before the target change, in the case of any non-negative overnight interest rate. Because overnight rates could never be negative, the Fed would not be able to maintain its target long bond rate on the day before the target change, by any means short of buying the entire outstanding stock of 10-year bonds; and in that case, the sense in which it would have succeeded in achieving its target for the long rate would be a meaningless one. It would have succeeded in maintaining the 10-year Treasury rate at the desired level only by decoupling the purported "10-year Treasury rate" from the interest rate at which any lending at that maturity in the private economy would occur.

In the case of a one-basis-point expected *decrease* in the target rate, it would be possible in principle for the Fed to maintain the previous target 10-year rate on the day before the target change, at the price of raising the

[3]Note that the loss in question would correspond to an annualized rate of capital loss greater than 28 percent per year.

federal funds rate to over 30 percent; but it is likely that in practice, the Trading Desk would be unwilling to engage in large enough transactions to achieve this outcome. Hence also in this case, the Fed would likely be unable to control the long bond rate, in the period prior to an expected change (even a very small one) in the target. But once one recognizes this, one also sees that the anticipation of any small change in the 10-year bond rate (whether due to a Fed target charge, or to a change in the size of the discrepancy between the market rate and the Fed's target) will have this effect. Hence the Fed's ability to control its long-rate "instrument" would in all likelihood be limited.

None of this means that it might not be useful for the Fed to pay attention to long bond rates as *indicators* of whether its policy is on track. If the Fed wishes to commit future policy in such a way as to change the expected future path of short rates, then an observation of the effect of its announcements on long bond rates will surely provide useful information regarding the degree of credibility of its statements. Thus it could well make sense for the Fed to monitor long rates, and to respond to perceived differences between current long rates and the ones that would be associated with the equilibrium that it is trying to bring about. As Eggertsson and Woodford (2003) discuss, it might even make sense for the Fed to engage in open-market purchases of long-maturity Treasury securities, when the prices of these are lower than would be consistent with the expectations regarding future policy that the Fed is trying to communicate; for such trades (on which the Fed would profit if its policy commitment turns out to be fulfilled) would be a way of making it credible to the private sector that the Fed itself believes in the policy commitments that it announces. But this would still not amount to making the long bond rate the "instrument of policy," as that term is ordinarily understood. Under the approach proposed by Eggertsson and Woodford, the Fed would still formulate an operating target for the federal funds rate, and it would also describe its commitments regarding the future conduct of policy by indicating how its target for the funds rate would be determined in the future. Observation of the level of long rates would be purely a source of information, one among many used to set the operating target for the funds-rate instrument.

References

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