Journal of Economic Dynamics & Control 90 (2018) 138–155

Contents lists available at ScienceDirect

Journal of Economic Dynamics & Control

journal homepage: www.elsevier.com/locate/jedc

Threshold-based forward guidance☆

Lena Boneva[a], Richard Harrison[b,*], Matt Waldron[c]

[a] Bank of England and CEPR, UK
[b] Bank of England and Centre for Macroeconomics, UK
[c] Bank of England, London, UK

ARTICLE INFO

Article history:
Received 1 December 2017
Revised 31 January 2018
Accepted 1 February 2018
Available online 8 February 2018

JEL:
E17
E31
E52

Keywords:
Monetary policy
Zero lower bound
Forward guidance
Thresholds

ABSTRACT

When the monetary policy rate is at the zero bound, "threshold-based forward guidance" (TBFG) is a state-contingent promise to delay liftoff from the zero bound until macroeconomic variables breach particular "thresholds". We study TBFG within a stochastic version of the workhorse New Keynesian model. We show that TBFG can be used to provide temporary stimulus, while also limiting the time inconsistency of policy promises. Existence of a unique equilibrium requires the policymaker to specify how the thresholds should be interpreted, as well as their values. With an appropriate choice of thresholds, TBFG outperforms forward guidance based purely on calendar time and substantially reduces welfare losses compared to the optimal time-consistent policy.

1. Introduction

In response to the global financial crisis, central banks cut policy rates towards the zero lower bound and implemented a range of unconventional monetary policy measures, including an increased use of "forward guidance" about the future path of the policy rate. One such form of guidance is "threshold-based forward guidance" (TBFG), in which the policymaker ties liftoff from the zero bound to outcomes for certain macroeconomic variables, promising not to increase the policy rate (at least) until those variables breach pre-specified "threshold" values.

Though TBFG has been implemented in practice, little is known about how this policy works in theory. To the best of our knowledge, this paper is the first to study TBFG as a tool to improve outcomes at the zero lower bound using the workhorse infinite-horizon New Keynesian model.

Intriguingly, real-world policymakers have not attempted to use TBFG policy to provide stimulus to spending and inflation. This appears, in part, to reflect skepticism about their ability to commit credibly to behavior that is well known to

☆ We thank Thomas Lubik (the editor) and two anonymous referees for very helpful comments. We also thank Guido Ascari, Toni Braun, Fabio Canova, Alex Clymo, Wouter Den Haan, Taisuke Nakata, attendees at the Riksbank workshop on "Deflation", the Econometric Society 2015 World Congress, the ECB 2016 workshop on "Non-standard monetary policy measures" and seminar participants at the FRB Atlanta, Bank of England and UCL for comments. The views expressed in this paper are our own and not those of the Bank of England or any of its policy committees.

* Corresponding author.
E-mail addresses: lena.boneva@bankofengland.co.uk (L. Boneva), richard.harrison@bankofengland.co.uk (R. Harrison), matthew.waldron@bankofengland.co.uk (M. Waldron).

https://doi.org/10.1016/j.jedc.2018.02.003
0165-1889/

be time inconsistent (Nakata, 2015). We argue that TBFG could in fact be used as a temporary commitment device to improve outcomes at the zero bound, while also limiting the extent to which the policymaker promises to behave in a time inconsistent manner.

We use a simple New-Keynesian model to study a scenario in which a large negative demand shock causes the zero bound to bind. This generates a deep recession, given a policymaker who optimizes on a period-by-period basis (optimal discretion), and motivates our TBFG experiments in which the policymaker attempts to improve outcomes by temporarily deviating from time-consistent policy.

Our model is also the workhorse for several other studies of monetary policy at the zero bound (for example, Adam and Billi (2006) and Bodenstein et al. (2012)). The policy instrument is the short-term nominal interest rate (subject to a zero lower bound constraint) and the objective is to minimize a welfare-based loss function. The policymaker acts under discretion, so that policy is time consistent. We solve the model using projection methods to account for the nonlinearity induced by the zero bound.

We model TBFG as a one-off commitment not to increase the policy rate from the zero bound at least until particular macroeconomic variables have breached pre-announced threshold values. Once the economy has recovered sufficiently that the conditions have been met, the policymaker reverts back to setting policy under optimal discretion.

Exit from the TBFG policy is assumed to be probabilistic. The probability of exiting the TBFG policy is an increasing function of the amount by which the thresholds have been breached. This makes the expected exit date (a key determinant of the stimulus imparted by the policy) a continuous random variable, which we show is necessary to generate a unique equilibrium. More generally, we also show that TBFG policies are incomplete in the absence of sufficient detail about how the policymaker will act when the thresholds are breached.

We find that TBFG can substantially improve welfare relative to the time-consistent policy. In line with the "textbook" remedy to mitigating the zero bound constraint, TBFG can stimulate activity and inflation today by a promise of higher inflation in the future. In addition, TBFG can reduce the variance of the distribution of possible outcomes. If further negative shocks arise, prolonging the recession, the policy rate will be held at the zero bound for longer. In contrast, if positive shocks arrive, so that the economy recovers more quickly than originally expected, then liftoff from the zero bound will occur sooner and the stimulus will be removed.

In this way, TBFG can be viewed as a hedge against the asymmetric effects generated by the zero lower bound. The magnitude of the effect can be seen by comparing losses under threshold-based guidance with those under "calendar-based forward guidance" (CBFG), whereby the policymaker promises to hold the policy rate at the zero bound for a pre-specified length of time regardless of the state of the economy. While CBFG can improve expected outcomes and eliminate the negative skew in outcomes induced by the zero lower bound, it leads to worse outcomes for both positive and negative realizations of future demand shocks as it provides too much stimulus in "good" states and insufficient stimulus in "bad" states.

Our TBFG policy experiments represent a temporary deviation from time-consistent behavior and are by definition time inconsistent. As such, this may cast doubt on our assumption that the deviation is regarded as perfectly credible by agents in the model. We assess this by computing a measure of the extent to which the policymaker could achieve better outcomes by reneging on the threshold-based policy and reverting to the time-consistent policy. A corollary of the hedging property of TBFG is that the temptation to renege is much smaller than for calendar-based guidance. For realizations of the shocks in which the economy recovers more quickly than originally expected, the exit conditions are more likely to be met and policy automatically reverts to time-consistent behavior.

Our sensitivity analysis demonstrates that optimized threshold values depend on the structure of the economy, the nature of the disturbances, and the interpretation of the threshold conditions. For example, in the baseline calibration of the model in which demand shocks are dominant in driving the model's dynamics, optimized inflation and output gap threshold policies deliver similar losses. In contrast, an optimized inflation threshold performs better than an optimized output gap threshold in a version of the model in which cost-push shocks are more important. Nevertheless, there is a range of (inflation and output gap) threshold values for which welfare can be improved in all of the model specifications we consider. This suggests that TBFG could be a useful policy tool if policymakers are unsure of the true structure of the economy.

The mechanism by which TBFG delivers stimulus at the zero bound – reducing real interest rates by promising higher future inflation – is identical to that embedded in some other proposals for delivering stimulus at the zero bound (for example, Billi, 2015; Eggertsson and Woodford, 2003; Reifschneider and Willams, 2000). However, in comparison with those methods, TBFG could be criticized as a rather crude or brute force approach, since the central bank is prohibited from raising the policy rate until the thresholds have been breached. One practical attraction of the direct approach embedded in TBFG is likely to be that it is easier to communicate, as liftoff is tied to well measured and well understood goal variables (see, for example, Monetary Policy Committee, 2013).

Our results imply that the introduction of a TBFG policy is associated with substantial shifts in the expected paths of output, inflation and the policy rate. There is relatively little empirical evidence on the effects of forward guidance policies and the existing results are somewhat mixed. While Raskin (2013) reports substantial movements in interest rate expectations in response to the FOMC's August 2011 CBFG announcement, Haberis et al. (2017) show that interest rate expectations were virtually unaffected by the FOMC's December 2012 TBFG announcement. Similarly, del Negro et al. (2015) report substantial heterogeneity in the responses of financial prices and survey measures of expectations to FOMC forward guidance announcements, attributing the differences to the wording of the accompanying statements. One way to rationalize our