Available online at www.sciencedirect.com
ScienceDirect
Journal of Monetary Economics 54 (2007) 728–752
Journal of MONETARY ECONOMICS
www.elsevier.com/locate/jme

Discretionary monetary policy and the zero lower bound on nominal interest rates ☆

Klaus Adam[a,*], Roberto M. Billi[b]

[a]*CEPR, London and European Central Bank, Directorate General Research, Kaiserstr. 29, 60311 Frankfurt, Germany*
[b]*Federal Reserve Bank of Kansas City, 925 Grand Blvd, Kansas City, MO 64198, USA*

Received 16 March 2005; received in revised form 16 November 2005; accepted 17 November 2005
Available online 19 December 2006

Abstract

Ignoring the existence of the zero lower bound on nominal interest rates one considerably understates the value of monetary commitment in New Keynesian models. A stochastic forward-looking model with an occasionally binding lower bound, calibrated to the U.S. economy, suggests that low values for the natural rate of interest lead to sizeable output losses and deflation under discretionary monetary policy. The fall in output and deflation are much larger than in the case with policy commitment and do not show up at all if the model abstracts from the existence of the lower bound. The welfare losses of discretionary policy increase even further when inflation is partly determined by lagged inflation in the Phillips curve. These results emerge because private sector expectations and the discretionary policy response to these expectations reinforce each other and cause the lower bound to be reached much earlier than under commitment.

JEL classification: E31; E52

Keywords: Nonlinear optimal policy; Occasionally binding constraint; Sequential policy; Markov perfect equilibrium; Liquidity trap

☆We would like to thank an anonymous referee who provided helpful comments and suggestions. Errors remain ours. The views expressed herein are solely those of the authors and do not necessarily reflect the views of the European Central Bank, the Federal Reserve Bank of Kansas City or the Federal Reserve System.
*Corresponding author. Tel.: +49 69 1344 6597.
E-mail addresses: klaus.adam@ecb.int (K. Adam), roberto.billi@kc.frb.org (R.M. Billi).

0304-3932/$ - see front matter © 2006 Elsevier B.V. All rights reserved.
doi:10.1016/j.jmoneco.2005.11.003

1. Introduction

The relevance of the zero lower bound on nominal interest rates for the conduct of monetary policy is a much debated issue among both policymakers and academics. Clearly, the economic experience of Japan during the last decade as well as the low levels of nominal interest rates prevailing in Europe and the United States contribute to the renewed interest in this topic.[1] Although deflationary pressures seem eventually to be subsiding, investigating this issue remains relevant for effectively dealing with such pressures should they reemerge.

Surprisingly, however, a systematic investigation of the policy implications arising from the lower bound in stochastic models with forward-looking agents is not available yet. This paper determines optimal discretionary monetary policy in a benchmark New Keynesian model, featuring monopolistic competition and sticky prices in the product market (see Clarida et al., 1999; Woodford, 2003), under standard conditions of uncertainty and taking explicitly into account the existence of the lower bound.

Studying a fully stochastic setup with lower bound is of interest because it allows us to calibrate the model, to the U.S. economy, and study the welfare implications of discretionary monetary policy. In particular, comparing our results to those obtained under commitment in Adam and Billi (2006), we illustrate that ignoring the existence of the lower bound one may significantly understate the value of policy commitment.

To facilitate comparison to the case with policy commitment we eliminate the discretionary inflation bias by assuming the existence of an appropriate output subsidy that offsets the monopoly distortion. For a purely forward-looking model, we then show that under discretionary monetary policy a fall in the 'natural' real rate of interest generates large output losses and a sizable amount of deflation.[2] In particular, for our benchmark calibration a negative three standard deviation value of the natural real rate leads to a negative output gap of about 8% and an annual rate of deflation around 1.8%.[3] The fall in both output and inflation is found to be considerably larger than in the case with policy commitment and does not show up at all if the model ignores the existence of the lower bound. In fact, under commitment the output gap is less than 2% and deflation is less than 0.1%.

As a result, the unconditional welfare losses generated by discretionary policy increase markedly if the model takes into account the lower bound. For our benchmark calibration the welfare equivalent consumption losses generated by discretionary policy increase by about 65%. However, we find that depending on the precise parameterization of the model the consumption losses may easily increase by as much as 300%. The consumption losses generated by discretionary policy increase even further if we depart from our fully forward-looking specification, allowing inflation to be partly determined by lagged inflation in the Phillips curve; see Billi (2005) for the case with policy commitment.

[1]For recent discussions see Auerbach and Obstfeld (2005), Coenen and Wieland (2003), Eggertsson and Woodford (2003), and Svensson (2003).

[2]The 'natural' real rate of interest is the real interest rate associated with the optimal allocation in the flexible price economy. Expectations of lower future productivity or higher future government spending, for example, cause the natural real interest rate to be low.

[3]The natural real rate then temporarily stands at −1.39%.