Economics Letters 121 (2013) 105–109

Contents lists available at ScienceDirect

Economics Letters

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

Disinflationary booms?

Christian Merkl *

Friedrich-Alexander-University Erlangen-Nürnberg, Germany
Kiel Institute for the World Economy, Germany
IZA, Germany

HIGHLIGHTS

- Announced disinflations under inflation targeting lead to a boom in a standard New Keynesian model.
- The result is robust.
- This differs from previous findings under monetary targeting.

ARTICLE INFO

Article history:
Received 3 April 2013
Received in revised form
16 July 2013
Accepted 17 July 2013
Available online 24 July 2013

JEL classification:
E30
E31

Keywords:
Disinflation
Disinflationary boom
Inflation targeting

ABSTRACT

This paper shows that *announced* credible disinflations *under inflation targeting* lead to a boom in a standard New Keynesian model (i.e. a disinflationary boom). This finding is robust with respect to various parameterizations and disinflationary experiments. Thus, it differs from previous findings about *disinflationary booms under monetary targeting*.

1. Introduction

Ball (1994) shows in an influential theoretical paper that an announced credible disinflation leads to a boom in a New Keynesian model (NKM) under monetary targeting (i.e. a central bank that controls the money supply). By contrast, disinflations in reality are associated with major output losses. Disinflationary booms have thus been considered as one of the major weaknesses of this model class (e.g. Mankiw, 2001 and Mankiw and Reis, 2001). However, follow-up research has shown that disinflationary booms under monetary targeting may disappear when money demand is interest sensitive (Ascari and Rankin, 2002).

In the last decades, monetary policy in most OECD countries has moved from monetary targeting to inflation targeting (i.e. central banks follow interest rate rules with an inflation target). This paper considers the effects of an announced credible disinflation in a NKM with a Taylor interest rate rule. It is first to show that *disinflationary booms* are a robust feature of small-scale NKMs *under inflation targeting*.

2. Model and disinflation experiment

I use a standard small-scale NKM where prices are set according to Calvo (1983).[1] All findings are established in a full nonlinear setting to prevent biases due to the loglinearization (Ascari and Merkl, 2009). See the Appendix for the full set of nonlinear equations.

The central bank follows a Taylor interest rate rule. The nonlinear version is:

$$\left(\frac{1+i_t}{1+\bar{\imath}_t}\right) = \left(\frac{\pi_t}{\bar{\pi}_t}\right)^{\phi_\pi}, \tag{1}$$

i.e. the central bank targets a certain steady state inflation rate $\bar{\pi}_t$. It reacts to positive (negative) deviations of the actual inflation rate π_t from its target by changing the actual nominal interest rate i_t

* Correspondence to: Chair of Macroeconomics, Lange Gasse 20, 90403 Nürnberg, Germany. Tel.: +49 911 5402 337.
E-mail address: christian.merkl@fau.de.

[1] No indexation is assumed. The robustness with respect to this assumption will be discussed at the end of Section 3.

0165-1765/$ – see front matter
http://dx.doi.org/10.1016/j.econlet.2013.07.017

above (below) the natural rate of interest $\bar{\imath}_t$. The weight on inflation is denoted by ϕ_π (with $\phi_\pi > 1$ to ensure that the Taylor principle holds). The more aggressive the central bank reacts to inflation, the larger is ϕ_π. For simplicity and illustration purposes, I do not include output in the Taylor rule. However, including empirically plausible output coefficients leaves the main result of this paper unaffected.

An announced disinflation means that the central bank will reduce its inflation target to a lower level in the future (in period $t + x$), while following the old inflation target from period t to $t + x - 1$. There is no credibility problem, i.e. rational economic agents trust the central bank and it actually implements the policy in period $t+x$. In my numerical exercise, I use the Newton–Raphson algorithm proposed by Boucekkine (1995) and Laffargue (1990).

3. Baseline results and robustness

In the baseline specification, I parameterize the model with standard values (see the Appendix for a table). The subjective discount factor β is set to 0.99. Utility is separable in consumption and leisure. The utility is logarithmic in consumption and the disutility of labor is quadratic. The elasticity of substitution for different goods types under monopolistic competition is equal to 10 (i.e. the average mark-up is 11%). The Calvo non-readjustment probability is equal to 75% per quarter (i.e. the average price duration is one year). The production function is assumed to be linear in labor. The weight on inflation in the Taylor rule is 1.5. I assume a disinflation from 1% annual inflation to zero percent because this leaves the steady state almost unaffected. It turns out that this normalization is irrelevant but useful for illustration purposes. In the baseline scenario, I assume that the inflation is announced four quarters before it is actually implemented.

Fig. 1 shows the model economy's reaction to this disinflationary experiment. Period 0 depicts the old steady state before the disinflation announcement. The central bank announces in period 1 that it will lower its inflation target from period 5 onwards. What is the intuition for the rise in output (i.e. the disinflationary boom), which amounts to a peak effect of almost one quarter percentage point of GDP?

Firms anticipate the lower inflation rate in the future and start adjusting to this new policy once they learn about it in period 1. Those firms that are allowed to adjust their prices according to the Calvo mechanism therefore raise them by less than in the absence of the announced disinflation policy. Eq. (2) illustrates the underlying mechanism.

$$P_{i,t} = \left(\frac{\varepsilon}{\varepsilon - 1}\right) \frac{E_t \sum_{j=0}^{\infty} \theta^j \Delta_{t,t+j} P_{t+j}^{\varepsilon} Y_{t+j} MC_{i,t+j}^{r}}{E_t \sum_{j=0}^{\infty} \theta^j \Delta_{t,t+j} P_{t+j}^{\varepsilon-1} Y_{t+j}}. \quad (2)$$

The optimal price $P_{i,t}$ of those firms that can readjust is a mark-up $\frac{\varepsilon}{\varepsilon-1}$ over the expected future nominal marginal costs,[2] weighted with the stochastic discount factor $\Delta_{t,t+j}$ and the Calvo non-adjustment probability θ. There is a direct and an indirect effect under announced disinflations. The lower future inflation target leads to a smaller growth rate of nominal marginal costs as soon as the disinflation is implemented. This affects the price setting behavior directly. Since firms anticipate this and adjust to it before the central bank shifts the inflation target, this indirect effect dampens prices and nominal marginal costs immediately and has a further moderating effect on inflation.

Since the central bank still follows its old inflation target at the time of the announcement and the natural interest rate still remains at its old level, due to the Taylor rule the more moderate inflation leads to a reduction of nominal interest rates. This generates a lower real interest rate[3] and stimulates consumption (according to the Euler consumption equation), i.e. it creates a disinflationary boom.

A few words are in order why inflation converts back to the new steady state (almost) immediately when the new inflation target is implemented. The reason is straightforward in the linearized version of the small-scale NKM where the dynamic system only contains forward looking variables (i.e. no state variables). Thus, the dynamic system has no endogenous persistence and converges back to the steady state once the central bank implements the new inflation target.[4]

The intuition for disinflationary booms is similar to Ball's (1994) reasoning under monetary targeting. At the time of the announcement, the nominal money supply growth remains unaffected, but prices start growing at a slower pace (due to the anticipation effects of price setters as illustrated by Eq. (2)). Thus, the real money supply increases, leading to a boom. However, there is one major difference. Ball's result can be reversed if the interest rate sensitivity of money demand is sufficiently large (Ascari and Rankin, 2002). In this case, an announced disinflation also raises the money demand due to lower nominal interest rates (i.e. the opportunity costs of holding money falls). This money demand effect may overturn the money supply effect. Thus, under monetary targeting, it is an empirical question which of these effects dominate. However, under inflation targeting there is no comparable countervailing effect because the money demand is irrelevant for the outcomes in the economy.

To illustrate the robustness of this disinflationary boom result, Fig. 2 shows that disinflationary booms occur under various parameterizations and disinflation experiments. The upper left panel shows the magnitude of the disinflationary boom under different initial steady state inflation rates. The larger the initial steady state inflation rate, the larger is the disinflationary boom. A stronger announced disinflation leads to a stronger reduction of inflation during the anticipation period, thereby reduces nominal and real interest rates by more and stimulates consumption more substantially.[5] The lower left panel shows the model reaction when disinflation is announced 2 or 6 periods in advance instead of 4 periods. The longer the announcement period, the stronger is the boom. A longer announcement period means that the central bank implements the lower inflation via its Taylor rule at a later stage, while inflation drops from the time of announcement. Thus, it leads to a longer time period with lower real interest rate and a prolonged boom.

The upper right panel shows the output response when the Calvo parameter is reduced to 0.5 and 0.66 (i.e. an average price duration of 2 and 3 quarters respectively), as price adjustments may be more frequent in times of disinflations. The quantitative magnitude of the disinflationary boom is reduced because future periods obtain a smaller weight in Eq. (2). However, output gains remain. And the lower right panel shows the response under a different Taylor rule parameter (namely, 1.1 and 3 instead of 1.5). The

[2] The nonlinear expression contains aggregate prices P, aggregate output Y and firm-specific real marginal costs $MC_{i,t+j}^{r}$. The dependence on future marginal costs is easier to see in the log-linearized equation: $\hat{p}_{i,t} = (1 - \beta\theta) E_t \sum_{j=0}^{\infty} \beta\theta \hat{m}c_{t+j}^{n}$, where hatted variables refer to log-deviations from the steady state and ^{n} refers to the nominal marginal costs.

[3] Due to the Taylor principle ($\phi_\pi > 1$), the central bank reduces the nominal interest more than proportionally relative to the lower inflation. Note that the real interest rate in Fig. 1 is the ex post interest rate, i.e. calculated based on the realized nominal interest rate and the realized inflation (not the ex ante expected values).

[4] In the full nonlinear setting, the price dispersion is a state variable and thus generates a tiny deviation from steady state after the implementation of the new inflation target (see Fig. 1).

[5] Note that the steady state shift of the output is more severe with a larger initial steady state inflation rate. Price dispersion effects generate inefficiencies in the nonlinear framework and thus reduce output. See e.g. Graham and Snower (2008) for a more detailed discussion.