Journal of Macroeconomics 39 (2014) 24–41

Contents lists available at ScienceDirect

Journal of Macroeconomics

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

Asymmetric monetary policy towards the stock market: A DSGE approach

Søren Hove Ravn *

Danmarks Nationalbank, Economic Research, Havnegade 5, Copenhagen K 1093, Denmark

ARTICLE INFO

Article history:
Received 2 January 2013
Accepted 7 November 2013
Available online 22 November 2013

JEL classification:
E13
E32
E44
E52
E58

Keywords:
Asymmetries
Monetary policy
Asset prices
DSGE modeling

ABSTRACT

In the aftermath of the financial crisis, it has been argued that a guideline for the design of the future policy framework should be to take the 'a' out of 'asymmetry' in the way monetary policy deals with asset price movements. Recent empirical evidence has suggested that the Federal Reserve may have followed an asymmetric policy towards the stock market in the pre-crisis period. According to these findings, monetary policy in the US before the crisis involved a reaction to stock price drops, but no reaction to increasing stock prices. The present paper studies the effects of such a policy in a DSGE model. The asymmetric policy rule introduces an important non-linearity into the model: Booms in output and inflation tend to be amplified, while recessions are dampened. Moreover, such a policy gives rise to expectations-driven booms in asset prices. We further investigate to what extent an asymmetric stock price reaction could be motivated by the desire of policymakers to correct for inherent asymmetries in the way stock price movements affect the macroeconomy.

1. Introduction

While the recent financial and economic crisis does not invalidate everything we have learned about macroeconomics since 1936, as Barro (2009) eloquently puts it, it has led economists to reconsider some ideas that once were considered common sense. As one example, the crisis has led to a revival of the debate about the role of asset prices in monetary policy; see Kuttner (2011) for an overview. Despite some enduring disagreement, a certain degree of consensus had been reached before the crisis, according to which central banks should not lean against asset price movements. The reason for this was not only that 'bubbles' in asset prices may be extremely hard to identify in real time, but also that even in the face of 'normal' fluctuations in asset prices, the interest rate tool may be too blunt and have unpleasant side effects. Instead, monetary policymakers should stand ready to cut the interest rate in response to plummeting asset prices.[1] The aftermath of the crisis has witnessed an emerging appreciation and critique of an inherent asymmetry in this approach to monetary policy (e.g. White, 2009; Mishkin, 2010; Issing, 2011). In the words of Stark (2011), the consensus implied that '*monetary policy should react to asset price busts; not to asset price booms*'. Issing (2011) points to the risk that such a policy might lead to moral hazard problems by covering part of the downside risk faced by investors in the stock market.

Some recent studies lend empirical support to the existence of an asymmetric monetary policy towards the stock market in the US before the crisis. Ravn (2012) finds that during the period 1998–2008, a 5% drop in the S&P 500 index increased the

* Tel.: +45 26557335.
E-mail address: shr@nationalbanken.dk

[1] This view has been coined the 'pre-crisis consensus' by Bini Smaghi (2009), and the 'Jackson Hole consensus' by Issing (2009).

0164-0704/$ - see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.jmacro.2013.11.002

probability of a subsequent 25 basis point interest rate cut by between 1/3 and 1/2, depending on the estimation method. On the other hand, he finds no significant policy reaction to stock price increases. Similarly, Hoffmann (2013) reports that for the longer period 1987–2008, the Federal Reserve lowered interest rates in response to stock market drops, but did not raise rates when stock prices boomed. For the same sample period, Hall (2011) finds that stock price deflation led to a highly significant cut in the interest rate, and that the inclusion of stock price deflation improves the fit of an estimated Taylor rule.

In this paper, we contribute to the recent debate by examining the effects of an asymmetric monetary policy in general equilibrium. We build a Dynamic Stochastic General Equilibrium (DSGE) model in which asset prices play an important role via the financial accelerator of Bernanke et al. (1999). We then allow the central bank to follow a monetary policy rule with an asymmetric reaction to stock prices. This introduces an important discontinuity into the model that cannot be 'log-linearized away'. As a result, it is not possible to solve the model using standard techniques. Instead, we apply a numerical solution method which exploits the piecewise linearity of the model. Essentially, the model consists of two linearized systems around the same steady state; one system for when stock prices are increasing (or constant), and another for when they are decreasing. We construct a 'shooting' algorithm to detect the switching points between these systems in order to solve the model. In this sense, we make a methodological contribution to the sparse literature on endogenous regime switching in monetary policy initiated by Davig and Leeper (2006). The solution method is similar to the one used by Bodenstein et al. (2009) to deal with the zero lower bound on interest rates, which in turn builds on work by Eggertson and Woodford (2003) and Christiano (2004).

The analysis uncovers some interesting implications of the asymmetric policy. By reacting only to stock price drops, the central bank induces an outcome where booms in output and inflation are amplified, while recessions are dampened. In other words, the asymmetric policy translates into an asymmetric business cycle. We briefly relate this finding to the existing literature on asymmetric business cycles. In addition, the asymmetric policy gives rise to what we call an *anticipation boom* in asset prices. In the wake of an expansionary shock, the asset price jumps up. It turns out that this jump is larger than in a model with no reaction to stock price changes, despite the fact that in both cases, the actual policy reaction to stock prices is zero during the asset price boom. The anticipation boom, which measures the *additional* rise in asset prices when the asymmetric policy is introduced, can be attributed to forward-looking agents anticipating that whenever stock prices start falling, the central bank will cut the interest rate. This implicit, partial insurance against asset price drops amplifies the rise in asset prices immediately after the shock. If the asymmetric policy reaction to stock prices is of the magnitude found in the recent empirical studies, these effects are quantitatively quite small. In the literature, an important divergence exists between the magnitude of the reaction to asset prices found in empirical studies, which is often quite small, and the values used in theoretical investigations, which are usually a lot larger. To bridge this gap, we therefore also employ a value of the reaction parameter which is more in accordance with the values in other theoretical contributions. When this is done, the above effects are sizeable. In general, we conclude that while an asymmetric policy has the theoretical potential to generate severely skewed business cycles and important additional asset price volatility, the asymmetric reactions found in recent empirical studies are too small to have had quantitatively important macroeconomic effects.

We also discuss potential motivations for an asymmetric monetary policy. One such motivation could be an asymmetric loss function of the central bank, as previously studied in the literature. Another potential explanation is that such a policy could be an attempt by the central bank to 'correct for' other asymmetries in the economy, in particular in the way stock prices influence the macroeconomy. We therefore evaluate how an asymmetric monetary policy interacts with other potential asymmetries, such as the financial accelerator of Bernanke et al. (1999) and the stock wealth effect on consumption. We demonstrate that if the financial accelerator is assumed to be stronger when net worth of firms is low, as has been suggested by several authors, the asymmetric policy is able to 'cancel out' this asymmetry in the case of supply shocks, but not after demand shocks. A similar conclusion is reached under the assumption of asymmetric wealth effects.

The debate about the role of asset prices in monetary policy goes back at least to Bernanke and Gertler (1999, 2001), who argue that monetary policy should not react to asset prices *per se*. This view has received support from Gilchrist and Leahy (2002) and Tetlow (2005), as well as in speeches by leading Federal Reserve officials (Kohn, 2006; Mishkin, 2008). In contrast, Cecchetti et al. (2000) find that the optimal monetary policy rule does include a reaction to the stock market. Bordo and Jeanne (2002) and Borio and White (2003) arrive at the same conclusion.

While most of these first contributions to this debate assumed the presence of a 'bubble' term in the asset price, more recent studies have focused on monetary policy reactions to fundamental movements in asset prices. Faia and Monacelli (2007) find that there is no additional welfare gain from reacting to asset prices on top of what may be obtained through a strong reaction to inflation. Leduc and Natal (2011) arrive at the opposite result, and explain how this difference is related to the assumption of Faia and Monacelli (2007) that policymakers are able to compensate workers in a lump-sum manner for the distortion arising from monopolistic competition, thereby making the flexible-price equilibrium efficient. Gilchrist and Saito (2008) assume that private agents and policymakers learn about the underlying trend growth in productivity over time. In their setup, the desirability of a policy reaction to asset prices depends on the information structure of the economy. In the present paper, we follow this recent tradition and abstract from asset price 'bubbles'.[2]

[2] Another common feature of these studies is the crucial role played by financial frictions, which we also include in our model as described in the next section.