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News shocks, nonseparable preferences, and optimal monetary policy

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ABSTRACT

Extending and modifying the canonical New Keynesian (NK) model by embedding a nonseparable Jaimovich/Rebelo (2009)-type utility function, this study provides a novel approach to examine the impact of anticipated shocks, called "news shocks", on business cycles. It can be shown that news shocks cause larger economic fluctuations than unanticipated shocks of the same form and thus behave in a welfare-reducing manner. Given this, the paper explores how (optimal) monetary policy should be conducted. In line with earlier studies, the investigation of several Taylor-type interest rate rules shows that the lowest welfare losses can be achieved based on rules that respond to both contemporaneous and expected future macroeconomic conditions.

1. Introduction

The nature of business cycle activities is a long-standing debate among macroeconomists. In recent years, there has been a renewed interest in a deep-seated idea tracing back to Pigou (1927)—that cyclical fluctuations cannot be explained solely by unpredictable random shocks that immediately cause reactions in current macroeconomic fundamentals, such as aggregate productivity. Even households' expectations about future economic development represent a key determinant.[1]

In this context, there is a growing body of literature that discusses the relevance and impact of anticipated shocks, called "news shocks". News shocks contain useful information for predicting future fundamentals but do not cause changes in current fundamentals; thus, these shocks only affect agents' expectations.

Beaudry and Portier (2006) use a structural vector autoregressive (VAR) approach to evaluate the role of news shocks. They find that news about total factor productivity is responsible for about 50 percent of the variance in consumption, output, and hours worked. Schmitt-Grohé and Uribe (2012) use an estimated Real Business Cycle (RBC) model to show that news shocks account for over 40 percent of output fluctuations. In fact, most studies emphasize the destabilizing effects of anticipated shocks as a quantitatively important source of economic fluctuations (see, for instance, Beaudry and Lucke, 2010; Davis, 2007; Fève et al., 2009; Leeper et al., 2008; and Winkler and Wohltmann, 2012). In contrast, comparatively few papers—like those of Kahn and Tsoukalas (2012) and Forni et al. (2014)—conclude that news shocks play a relatively minor

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[1] See, for instance, Beaudry and Portier (2014), who provide a comprehensive literature review on the hypothesis of news-driven business cycles.

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role in explaining business cycle activities.[2] In particular, Kahn and Tsoukalas (2012) document that news shocks explain less than 15 percent of output fluctuations. In a recent paper, Offick and Wohltmann (2016) bridge the gap by focussing on both fully anticipated and partially anticipated monetary policy shocks. Using a dynamic Dornbusch-type model, they highlight that partial anticipation of monetary policy shocks may lead to lower macroeconomic activity than fully anticipated shocks of the same form.

The present paper contributes to the ongoing debate surrounding the relevance of anticipated shocks on economic activities by examining their welfare implications for an economy. In this way, the paper is linked to Jaimovich and Rebelo (JR) (2009), who show that an increase in the availability of information leads to a reduction in economic fluctuations. For this purpose, they propose a RBC framework that is able to generate pro-cyclical economic development in response to good news—in the form of anticipated productivity shocks—about the future. Applying the methods suggested by JR (2009) by embedding their nonseparable preference structure in the baseline New Keynesian (NK) model, this paper provides a novel model framework.

Second, the paper is closely related to Wohltmann and Winkler (2009)—one of the few studies examining both welfare aspects and (optimal) monetary policy in case of anticipated shocks in the baseline NK model.[3] In contrast to Wohltmann and Winkler (2009), this paper investigates the welfare dynamics of news shocks as well as their (optimal) monetary policy implications given the above-mentioned novel dynamic stochastic general equilibrium (DSGE) model structure, including a nonseparable JR (2009)-type utility function.

The main results are as follows: (1) Compared to unanticipated cost-push shocks, anticipated cost-push shocks amplify the volatility of endogenous variables (such as output, price level, and hours worked) and thus behave in a welfare-reducing manner. (2) An investigation of optimal simple interest rules shows that the lowest welfare loss correlates with a central bank's monetary policy in which interest rate rules respond not only to contemporaneous but also to expected values of inflation and output.

The paper is organized as follows: Section 2 details the DSGE model framework. Section 3 investigates macroeconomic volatility effects and monetary policy implications when an economy is faced with (un)anticipated cost-push shock. Section 4 concludes.

2. Theoretical framework

A rational expectations NK model for a cashless economy without capital, as proposed by Galí (2008), is assumed.[4] However, the conventional additively separable utility function of the canonical NK model is replaced by a preference structure that was first proposed by Greenwood et al. (1988) and then generalized by JR (2009). Therefore, the utility U follows the general structure $U(X) = \frac{X^{1-\sigma}-1}{1-\sigma}$ with $X = C - \psi N^{\theta} S$. More precisely, the period utility function U_t of an infinitely-lived representative household is given by the following:

$$U_t = E_t \sum_{k=0}^{\infty} \beta^k U_{t+k}(C_{t+k}, N_{t+k}, S_{t+k}) = E_t \sum_{k=0}^{\infty} \beta^k \left[\frac{(X_{t+k})^{1-\sigma} - 1}{1-\sigma} \right] \tag{1}$$

$$\text{with } X_{t+k} = C_{t+k} - \psi N_{t+k}^{\theta} S_{t+k} \tag{2}$$

$$\text{and } S_{t+k} = C_{t+k}^{\gamma} S_{t+k-1}^{1-\gamma}, \tag{3}$$

where $U_{t+k}(k = 0, 1, 2, \ldots)$, $0 < \beta < 1$, $\psi > 0$, $0 < \gamma < 1$, $\theta > 0$, and $\sigma > 0$. E_t is the expectation operator, which is conditional upon information available up to period t. β is the discount factor. S_t, the geometric average of current and past consumption levels, represents a backward-looking element and implicates the nonseparability in preferences over consumption C_t and labor service N_t. $\frac{1}{\sigma}$ and θ represent the intertemporal elasticity of consumption and labor supply, respectively. A crucial element in the utility function is parameter $\gamma \in (0, 1)$, as this parameter stands for the household's substitution behavior between consumption and hours worked (or leisure) as a consequence of an economic shock. If, for example, a favorable productivity shock hits an economy, households increase both consumption and leisure. The latter requires a reduction in labor supply, which causes a decline in output. Controlling for the household's adjustment process—or, in other words, the strength of the wealth effect on labor supply—suggests the possibility of generating procyclical comovements of endogenous variables in the presence of unanticipated shocks as well as news shocks of the same form. Adopting the preference specification according to Greenwood et al. (1988) called GHH preferences by setting $\gamma = 0$ completely eliminates the wealth effect and thus avoids a downward shift in labor supply (due to anticipated positive technology shocks). Therefore, labor supply depends only on the current real wage. Consequently, high values of parameter γ imply a high wealth

[2] Other studies that provide proof that news about the future represents a relatively irrelevant source of business cycle fluctuation are, for instance, Barsky and Sims (2011), Barsky et al. (2015), and Fujiwara et al. (2011).

[3] Further studies that address the question of how monetary policy should be conducted in the presence of anticipated shocks include Kapinos (2011), Best and Kapinos (2016), and Winkler and Wohltmann (2011).

[4] For a detailed derivation of the basic NK model, see Galí (2008) and others.