Journal of Macroeconomics 38 (2013) 218–226

Contents lists available at SciVerse ScienceDirect

Journal of Macroeconomics

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

Gains from commitment in monetary policy: Implications of the cost channel ☆

Ufuk Devrim Demirel *

University of Colorado at Boulder, Department of Economics, 256 UCB, Boulder, CO 80309, USA

ARTICLE INFO

Article history:
Received 24 August 2012
Accepted 17 June 2013
Available online 5 July 2013

JEL classification:
E44
E52

Keywords:
Cost channel
Optimal monetary policy
Commitment
Discretion

ABSTRACT

Many empirical studies find robust evidence that marginal cost of production directly depends on the nominal rate of interest. This relationship induces a cost channel for monetary policy transmission. Although the empirical literature provides ample evidence for a cost channel, studies that evaluate the welfare gains from monetary policy commitment have so far entirely ignored its presence. This study shows that, overlooking the cost channel, one significantly underestimates the welfare gains from monetary policy commitment. I find that there is a robust positive relationship between the size of the cost channel and welfare gains from monetary policy commitment. Using a version of the new Keynesian model calibrated to the US economy, I find that failure to take into account the presence of a cost channel leads to an understatement of the gains from monetary policy commitment by an amount equivalent to a 0.48 percentage points permanent cut in quarterly inflation.

1. Introduction

In dynamic economic systems, private agents' current choices depend upon their expectations of future government actions. In their seminal contribution, Kydland and Prescott (1977) discuss how this property often generates a policy environment in which commitment on the part of the policy maker to an optimal plan delivers superior welfare outcomes relative to discretionary policy. The new Keynesian model of Clarida et al. (1999), which has become a benchmark framework for macroeconomic policy analysis, is a glaring example for a policy setup in which the commitment capacity of the policy maker matters for welfare outcomes. Consequently, studies that quantitatively evaluate the welfare gains from commitment in monetary policy frequently adopt the new Keynesian setup (see e.g., Demirel, 2012; Adam and Billi, 2007; Schaumburg and Tambalotti, 2007; Dennis and Soderstrom, 2006). In the standard new Keynesian model, monetary policy affects the economy only through a conventional demand-side channel, i.e. by influencing households' saving and investment decisions. A number of empirical studies (including Tillmann, 2008; Ravenna and Walsh, 2006; Barth and Ramey, 2001), however, find robust evidence that firms' marginal cost directly depends on the nominal interest rate, which points to a supply-side mechanism for monetary policy transmission referred to as the *cost channel*. In this paper, I show that studies that disregard this supply-side transmission channel significantly underestimate the value of monetary policy commitment. I find that, in the presence of a cost channel, welfare gains from full commitment in monetary policy can be much greater relative to an economy in which monetary policy is transmitted only through a demand-side mechanism.

☆ I would like to thank an anonymous reviewer and Theodore Palivos for valuable comments and suggestions.
* Tel.: +1 303 492 2585.
E-mail address: demirel@colorado.edu

0164-0704/$ - see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.jmacro.2013.06.005

To facilitate comparison with the related literature, I adopt a version of the new Keynesian model that accommodates a cost channel. As in Ravenna and Walsh (2006) and Cooley and Nam (1998), I incorporate a cost channel into the model by introducing a working capital constraint, which requires firms to pay for a certain fraction (denoted τ) of their operational costs in advance using borrowed funds. This specification links firms' marginal cost directly to the nominal rate of interest and induces a cost channel for monetary policy transmission. In this setup, the parameter τ measures the intensity of the cost channel. In the case $\tau = 0$ a cost channel is absent and cases that involve $\tau > 0$ capture varying intensity levels. For alternative values of τ, I evaluate the optimal monetary policy and compute welfare under full discretion and full commitment. I show that the welfare gains from monetary policy commitment increase monotonically in the parameter τ. Thus, when a cost channel is present (i.e. when $\tau > 0$), monetary policy commitment yields greater welfare gains.

The intuition behind this result is rather straightforward. As is well known, in the face of cost-push disturbances, the policy maker in the new Keynesian model faces a trade-off between stabilizing inflation and stabilizing the output gap. Full policy commitment yields higher welfare because it enables the policy maker to effectively control private agents' future expectations, which leads to a more favorable inflation/output-gap trade-off in the face of cost-push shocks. But, as discussed in Demirel (2009) and Ravenna and Walsh (2006), in the presence of a cost channel, a trade-off between stabilizing inflation and stabilizing the output-gap emerges in the face of virtually all types of shocks. Since, in this environment any shock can act as a cost-push disturbance, the ability to manipulate future expectations makes a bigger difference in volatility outcomes relative to the case in which, due to absence of a cost channel, only a subset of shocks can pose a trade-off between stabilizing inflation and stabilizing the output-gap. Consequently, the value of monetary policy commitment increases significantly if a cost channel is present.

Quantitative findings suggest that an analysis based on a version of the new Keynesian model that entirely overlooks the presence of a cost channel underestimates the value of monetary policy commitment by an amount equivalent to a 0.48 percentage points permanent cut in quarterly inflation under a commonly adopted parametrization of the new Keynesian model. Although this figure can be sensitive to the choice of parameter values, it remains significant under reasonable parametrizations. Furthermore, the positive relationship between the size of the cost channel (as measured by the parameter τ) and the gains from monetary policy commitment is found to be robust under a range of parametrizations of the new Keynesian model as well as under alternative model specifications.

The rest of the paper is organized as follows: Section 2 outlines the model and derives the objective function and the constraints of the policy maker. Section 3 casts the optimal policy problem and discusses the solution procedures under full commitment and discretion. Section 4 presents the welfare computations and discusses the implications of the cost channel. Section 5 provides a robustness analysis and Section 6 concludes.

2. Model

The model economy is inhabited by a large number of identical households, a continuum of monopolistically competitive firms, and a benevolent government. Each household maximizes

$$U_s = E_s \sum_{t=s}^{\infty} \beta^{t-s} \left(\log C_t - \psi \frac{L_t^{1+\phi}}{1+\phi} \right) \tag{1}$$

where $\beta \in (0,1)$, variables C_t and L_t respectively denote composite consumption and work effort and ϕ, $\psi > 0$. Households consume a continuum of differentiated products (indexed by $i \in [0,1]$) each produced by a monopolistic competitor. The variable C_t corresponds to the Dixit-Stiglitz aggregator of differentiated products defined as $C_t = \left[\int_i C(i)_t^{(\sigma_t - 1)/\sigma_t} di \right]^{\sigma_t/(\sigma_t - 1)}$ where $C(i)_t$ denotes the consumption of variety i. The random variable σ_t denotes the elasticity of substitution between differentiated products and follows the process $\ln \sigma_t = (1 - \rho_\sigma) \ln \sigma + \rho_\sigma \ln \sigma_{t-1} + \varepsilon_{\sigma,t}$ where $\varepsilon_{\sigma,t} \sim N(0, \sigma_\sigma^2)$, $\sigma > 1$, and $\rho_\sigma \in [0,1)$. This specification implies that the individual demand for variety i and aggregate consumer price index are respectively given by $C(i)_t = (P(i)_t / P_t)^{-\sigma_t} C_t$ and $P_t = \left(\int_i P(i)_t^{1-\sigma_t} di \right)^{1/(1-\sigma_t)}$ where $P(i)_t$ denotes the price level for the i^{th} product.

Households enter each period with nominal balances M_t. They provide labor services to producers in a competitive labor market and receive wage income at the start of the period. Given their total nominal wealth, they make consumption, saving, and work decisions at the start of each period. Households face a cash-in-advance constraint that requires consumption expenditures to be made using nominal balances. They also have access to a bond market where they trade one-period government bonds (denoted B_t). The bond market opens at the start of each period and bonds mature at the end of the period they are purchased. Consequently, nominal balances of the household evolve according to the rule

$$M_{t+1} \leqslant M_t + W_t L_t - P_t C_t - B_t - T_t + R_t B_t + \Gamma_t \tag{2}$$

where W_t denotes the nominal wage rate, R_t is the gross nominal interest rate, $\Gamma_t = \int_i \Gamma(i)_t di$ and T_t respectively denote firm profits and taxes paid. The cash-in-advance constraint requires

$$P_t C_t \leqslant M_t + W_t L_t - B_t. \tag{3}$$

Households maximize (1) subject to (2) and (3), and individual demand functions. In an equilibrium with a positive net nominal interest rate, the following familiar first-order conditions must be satisfied: