Available online at www.sciencedirect.com
ScienceDirect
Journal of Macroeconomics 30 (2008) 928–940
Journal of MACROECONOMICS
www.elsevier.com/locate/jmacro

Alternative measures of marginal cost and inflation in estimations of new Keynesian inflation dynamics ☆

Carl R. Gwin [a,1], David D. VanHoose [b,*]

[a] *Graziadio School of Business and Management, Pepperdine University, 24255 Pacific Coast Highway, Malibu, CA 90263-4100, United States*
[b] *Hankamer School of Business, Department of Economics, Baylor University, P.O. Box 8003, Waco, TX 76798-8003, United States*

Received 13 September 2006; accepted 24 July 2007
Available online 9 August 2007

Abstract

In an important and highly influential paper [Gali, J., Gertler, M., 1999. Inflation dynamics: A structural econometric analysis. Journal of Monetary Economics 44, 195–222] develop and estimate a structural new Keynesian Phillips curve model of inflation dynamics based on the [Calvo, Guillermo, 1983. Staggered prices in a utility maximizing framework. Journal of Monetary Economics 12, 383–398] model of sticky prices. To estimate their model, Gali and Gertler measure inflation as the quarterly percentage change in the GDP deflator, and they consider a specific calculation of the deviation of labor-income share from its mean value as the only proxy measure of aggregate marginal cost. Most other researchers have followed their lead. In this paper, we closely replicate Gali and Gertler's results and compare these replicated results to those obtained when alternative measures of marginal cost and inflation are utilized. We find that estimations of the structural new Keynesian model of inflation dynamics are not particularly altered by using a marginal-cost measure based on actual industry costs but are sensitive to using a PPI-inflation measure that arguably is more appropriate for testing a theory of firm pricing. Furthermore, we find that utilizing a detrended measure of

☆ We are very grateful to Don Dutkowsky, Doug McMillin, and two referees for especially helpful comments. All errors, of course, are ours alone.
* Corresponding author. Tel.: +1 254 710 6206; fax: +1 254 710 6142.
E-mail addresses: carl.gwin@pepperdine.edu (C.R. Gwin), David_VanHoose@baylor.edu (D.D. VanHoose).
[1] Tel.: +1 310 506 7352; fax: +1 310 506 4126.

doi:10.1016/j.jmacro.2007.07.005

marginal cost yields results that are at least as plausible as those of Gali and Gertler, yet which generally suggest greater aggregate US price flexibility.

JEL classification: E31

Keywords: New Keynesian inflation dynamics; Price stickiness

1. Introduction

In a very influential paper that has been widely cited as justification for macroeconomic policy analysis based on sticky-price general-equilibrium models, Gali and Gertler (1999) construct and estimate a structural inflation model based on Calvo's (1983) model of sticky prices. To implement their empirical analysis, Gali and Gertler use a particular aggregate marginal-cost measure instead of an *ad hoc* output gap. They find that their measure of real marginal cost is an economically and statistically significant determinant of the inflation rate. Based on this outcome, as well as on parameter estimates that generally imply a discount factor between 0.90 and 0.99 and an average price-adjustment speed ranging from just under 6 quarters to slightly more than 11 quarters, Gali and Gertler conclude that their results "are consistent with the underlying theory" (p. 213). They are careful to note, however, that their results are "[c]onditional on [their] measure of marginal cost" (1999, p. 205), which is a scaled transformation of the US labor-income share, or aggregate real unit labor cost (real ULC). In related work examining European data, Gali et al. (2001) and McAdam and Willman (2004) also use income-share/ULC proxies as measures of real marginal cost. More recently, Gali et al. (2005) have contended, in answer to criticisms by Rudd and Whelan (2005) and Linde (2005), that the Gali-Gertler empirical methodology is robust to alternative specifications and estimation methods.

So far, however, the literature on estimations of new Keynesian inflation dynamics based on a sticky-price foundation have offered only limited evidence [see, for instance, Sbordone, 2002, Matheron and Maury, 2004, Leith and Malley, 2007, Gagnon and Khan, 2005, Rumler, 2005, Shapiro, 2006] about whether empirical results are robust in the face of alternative proxies for marginal cost and inflation measures. In this paper, we show that the results produced by Gali-Gertler-style estimations of hybrid (including both forward- and backward-looking inflation terms) new Keynesian inflation dynamics are highly sensitive to the choices of proxies for aggregate measures of marginal cost and of measures of inflation.

There are, of course, several alternative measures of the price level and inflation rate. Gali and Gertler (1999) and most of the literature that has followed use the GDP deflator as the relevant price index and examine GDP-deflator inflation. In this paper, we consider both the GDP deflator and the All Commodities producer price index (PPI), which reflects the prices actually charged by firms and hence corresponds more closely to the price choices of firms in the Calvo theory. In addition, because some doubt has been cast on the labor-income share as an appropriate measure of aggregate marginal cost, we develop an alternative measure based on firm costs revealed by US industry-level data.

In Section 2 that follows, we briefly review the Gali-Gertler specification of new Keynesian inflation dynamics, and we discuss both the unit-labor-cost measure of real