



The empirical validity of the New Keynesian Phillips curve using survey forecasts of inflation [☆]

Sandeep Mazumder

Department of Economics, Carswell Hall, Wake Forest University, Box 7505, Winston Salem, NC 27109, United States

ARTICLE INFO

Article history:
Accepted 30 June 2011

JEL classification:
E31

Keywords:
Inflation
Phillips curve
Marginal cost

ABSTRACT

This paper investigates the performance of the New Keynesian Phillips curve when survey forecasts of inflation are used to proxy for inflation expectations. Previous authors such as Brissimis and Magginas (2008) have applied survey measures of inflation expectations to the NKPC, and have concluded that these estimates are superior to those estimated using actual data on future inflation. However this approach employs the use of the labor income share as the proxy for real marginal cost, something which is highly problematic once we consider the countercyclicality of this variable. This paper develops and tests a procyclical marginal cost variable alongside various survey measures of inflation forecasts in the NKPC, while recognizing the problem of weak instruments that occurs when estimating the model using conventional GMM. We find that the NKPC produces a counter-intuitive negative and significant coefficient on procyclical marginal cost when surveys of inflation forecasts are used, which casts serious doubt on the empirical viability of the NKPC model, even when estimated with survey inflation forecasts.

© 2011 Elsevier B.V. All rights reserved.

1. Introduction

The ability to describe short-run inflation dynamics is a key and central goal of macroeconomists, largely due to the crucial role this has in determining how monetary policy should be conducted. To that end, in recent decades a great deal of time and attention has been devoted to modeling price setting behavior that is based on nominal rigidities, formulated using the work of authors such as Taylor (1980) and Calvo (1983). What resulted was the “New Keynesian Phillips Curve” (NKPC), a model implying that current inflation is determined by real marginal cost and expectations of future inflation. Although there has been plenty of debate about the validity of this model, for the most part it remains the workhorse of macroeconomics, perhaps attributable to the lack of a better alternative.

Empirically speaking, the NKPC became most popular following Gali and Gertler (1999)'s seminal work on the topic. Previous estimates of the NKPC attempted to proxy for real marginal cost in a variety of ways such as with the output gap. Gali and Gertler (1999) argue that a more natural proxy for marginal cost is the labor income share (or equivalently real unit labor costs), and demonstrate how the standard NKPC (and especially the ‘hybrid’ NKPC) fits U.S. inflation data particularly well using this driving variable. Since this paper it has become standard practice to use the labor income share as the proxy for marginal cost when estimating the NKPC.

Another literature that also estimates the NKPC focuses on the role of using survey measures of inflation expectations. For example, Roberts (1997) uses inflation forecasts obtained from the Michigan and Livingston surveys to estimate the NKPC in order to investigate how ‘rational’ inflation expectations are. In this paper, Roberts uses several candidates for the activity variable proxying for marginal cost: unemployment, GDP, and manufacturing capacity utilization. Others have also used survey measures of inflation forecasts in the NKPC, such as Adam and Padula (2003) and Henzel and Wollmershuser (2008). In both of these papers, unit labor costs are used as one of the primary measures of marginal cost, with Survey of Professional Forecasters (SPF) and Ifo World survey inflation forecasts. More recently, Brissimis and Magginas (2008) estimate the NKPC using SPF and Greenbook forecasts of inflation together with the labor income share, and also by estimating the model using actual data on future inflation.¹ One of the main results of this paper is that empirical estimates of the NKPC with inflation forecasts are superior to those obtained using actual future inflation data. Indeed, this is a recurring theme that implicitly runs throughout all of the aforementioned papers.

The notion of estimating the NKPC with forecasts of future inflation is an important topic, particularly when thinking about how one would forecast future inflation using the NKPC in real time. Unfortunately, the existing literature on this topic has not taken seriously how one should proxy for real marginal cost when

[☆] I would like to thank the anonymous referees for the valuable comments on revising this paper.

E-mail address: mazumds@wfu.edu.

¹ Which is the conventional method of estimating the NKPC when not employing survey data.

estimating the model. In particular, Mazumder (2010) argues that the labor income share is an overly simplistic proxy for marginal cost for two reasons: first, it implicitly assumes that labor has no adjustment costs, and second the labor income share is countercyclical, whereas theory suggests that marginal cost is likely to be procyclical. Mazumder (2010) argues that when estimating the NKPC one must take the issue of the cyclicity of marginal cost very seriously.

This paper adds to the literature about inflation forecasts in the NKPC in several ways. First, we implement an improved measure of marginal cost using the framework established by Bils (1987) that is further developed by Mazumder (2010), which accounts for labor adjustment costs and results in a procyclical marginal cost variable. Second, we recognize that the large majority of papers in this literature estimate the NKPC using conventional GMM. While this is important in the sense that instrumental variables are clearly required in the estimation procedure, it does not check for the presence of weak instruments which we find is certainly a problem when using conventional GMM. We correct for this by employing Fuhrer and Olivei (2004)'s 'Optimal Instruments' GMM estimation method, which imposes the dynamic constraints implied by the forward-looking relation on the chosen set of instruments. Finally, we explicitly test for the biasedness of survey expectations using inflation forecasts from the Michigan survey, SPF, and Greenbook data. This then allows us to determine the applicability of rational expectations conditional on the measure of inflation forecast that is used.

Our results suggest that a fundamental problem exists in the empirical estimation of the NKPC when survey measures of inflation forecasts are used.² In particular when the model is estimated using a procyclical proxy for marginal cost, we get a counter-intuitive negative and significant coefficient on real marginal cost. This is true with every type of inflation forecast considered, with detrended marginal cost measures, and in the hybrid version of the model as well. Indeed, analysis of the covariance between marginal cost and inflation less the forecast of inflation suggests that a procyclical proxy for marginal cost will almost always cause this negative coefficient to occur. This finding represents a strong rejection of the NKPC, which requires that this coefficient must be positive from the structural parameters underlying the model.

Therefore we can infer that estimates of the NKPC using the labor income share as the proxy for marginal cost implicitly rely on the countercyclicity of this variable to produce positive results. This paper finds the use of survey measures of inflation forecasts in place of actual data on future inflation to be a useful exercise, but it does not bypass the problem that we encounter when considering the cyclicity of marginal cost in the NKPC, which is something that future research must seriously consider.

2. Existing literature

The NKPC in its standard form (derived by rational expectations) can be written in the following way:

$$\pi_t = \lambda mc_t + \beta E_t\{\pi_{t+1}\} \quad (1)$$

where π_t is the inflation rate, mc_t is real marginal cost, and $E_t\{\pi_{t+1}\}$ are expectations of future inflation. There is a wide and varying literature that estimates the NKPC using survey measures of inflation expectations in place of $E_t\{\pi_{t+1}\}$, however few of these papers explicitly consider the cyclicity of marginal cost and its relationship with future inflation in the model. In particular, if during a boom firms increase their production levels, we must find that the short-run marginal cost curve is upward-sloping due to certain factors of production remaining fixed in the short

run. In other words, marginal cost ought to move with the business cycle.

One of the first papers to implement the use of survey measures of expectations in estimations of the NKPC with U.S. data was Roberts (1997), who uses inflation forecasts to distinguish between sticky inflation and less-than-perfectly rational expectations. In this paper, Roberts uses the Livingston survey of economists' inflation predictions and the Michigan survey of household inflation expectations to proxy for $E_t\{\pi_{t+1}\}$ in the NKPC. He finds that the use of survey forecasts of inflation suggests that it is imperfectly rational expectations that explain short-run inflation dynamics more so than sticky inflation, something which has been frequently debated by those who support the idea of a hybrid NKPC.³

When estimating the NKPC the conventional approach is to use realized inflation for π_{t+1} along with the rational expectation assumption that: $\pi_{t+1} = E_t\pi_{t+1} + \epsilon_{t+1}$. In other words, the assumption of rationality allows one to estimate the NKPC where an explicit measure of inflation expectations is not required. The problem with this approach, as Zhang et al. (2006) identify, is that even with rational expectations π_{t+1} tends to be more noisy than $E_t\pi_{t+1}$. This in turn can render NKPC estimates as quite unreliable with finite samples. Adam and Padula (2003) get around this problem by deriving a NKPC based on subjective expectations, rather than explicitly requiring the assumption of rationality. In particular, they argue that the NKPC can be derived as:

$$\pi_t = \lambda mc_t + \beta \bar{F}[\pi_{t+1}] \quad (2)$$

where $\bar{F}[\pi_{t+1}]$ represents the average of the forecasters' subjective expectations.⁴ Adam and Padula (2003) then use SPF forecasts of inflation to estimate the NKPC, using both the output gap and labor share as marginal cost proxies. While their estimates of the NKPC are relatively equal under either measure of marginal cost, the authors argue that the unit labor cost proxy rests on more solid theoretical grounds than does the output gap.⁵ Moreover the use of the output gap in the NKPC often results in a negative coefficient for λ (such as in Gali and Gertler, 1999), which according to theory must be positive. One other unique aspect of Adam and Padula (2003) is the fact that the authors estimate the NKPC using OLS rather than instrument variables. The authors' rationale for this is that their OLS estimates are consistent (when checked by the Hausman test) for their particular sample, even if there is potential for measurement error in both marginal cost and inflation expectations. However as many authors have argued (such as Roberts, 1997; Zhang et al., 2006; Brissimis and Magginas, 2008), measurement errors can arise in the NKPC in two ways: first, using inflation forecasts as proxies for unobservable inflation expectations could result in measurement errors, and second so too could the use of the labor income share as the proxy for real marginal cost. Indeed if we suspect that inflation forecasts are caused by the current inflation rate, then one can easily question the endogeneity of the regressors which necessitates the use of instrumental variables in place of OLS estimation.

Henzel and Wollmershuser (2008) extend the work of Adam and Padula (2003) by estimating the NKPC using Ifo world survey inflation forecasts data, but by also employing two-stage least squares to account for potential regressor endogeneity. Once again the labor income share is used as a key proxy for real marginal cost, and the authors find that the NKPC performs relatively well when survey forecasts of inflation are used, particularly when used in the hybrid NKPC. Similar conclusions are reached by Zhang et al. (2006) who

³ That is, the NKPC with lagged inflation included also.

⁴ Assuming that agents do not expect predictable movements of their own or other agents' expectations.

⁵ Coibion (2010) estimates the NKPC with survey forecasts of inflation and the output gap and finds that the model does well, but does not address the issue of estimating marginal cost directly.

² Mazumder (2010) argues this problem exists when actual data on future inflation is used as well.

Download English Version:

<https://daneshyari.com/en/article/5055372>

Download Persian Version:

<https://daneshyari.com/article/5055372>

[Daneshyari.com](https://daneshyari.com)