Optimal monetary policy in an economy with inflation persistence ☆

Jón Steinsson

Department of Economics, Harvard University, Littauer Center, Cambridge, MA 02138, USA

Abstract

This paper studies optimal monetary policy in a model where inflation is persistent. Two types of price setters are assumed to exist. One acts rationally given Calvo-type constraints on price setting. The other type sets prices according to a rule-of-thumb. This results in a Phillips curve with both a forward-looking term and a backward-looking term. The Phillips curve nests a standard purely forward-looking Phillips curve as well as a standard purely backward-looking Phillips curve as special cases. A cost push supply shock is derived from microfoundations by adding a time varying income tax and by making the elasticity of substitution between goods stochastic. A central bank loss function for this model is derived from a second-order Taylor approximation of the household's welfare function. Optimal monetary policy for different relative values of the forward- and backward-looking terms is then analyzed for both the commitment case and the case of discretion.
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1. Introduction

Ever since the publication of Phillips' (1958) famous paper documenting the apparent tradeoff between inflation and unemployment, the Phillips curve has been a central piece of macroeconomics. Few ideas in economics have been as controversial, as influential, and undergone as many fundamental revisions. Since Friedman (1968) and Phelps (1967) it has been widely appreciated that inflationary expectations are an important element of the Phillips curve. Two very different approaches to modeling how inflationary expectations enter the Phillips curve have been most popular in the literature. One approach uses lagged values of inflation as a proxy for current inflationary expectations. According to this approach, the Phillips curve takes the following form:

$$\pi_t = A(L)\pi_{t-1} + B(L)x_t,$$

where π_t is inflation in period t, x_t is the output gap in period t, while $A(L)$ and $B(L)$ are polynomials in the lag operator. We will refer to this as the "acceleration" Phillips curve.[1] Alternatively, it is often assumed that inflationary expectations are formed rationally in an environment of staggered price and wage adjustments. These assumptions result in a Phillips curve of the following form:

$$\pi_t = \beta E_t \pi_{t+1} + \kappa x_t,$$

where $E_t \pi_{t+1}$ is the conditional expectation of π_{t+1} at date t. We will refer to this as the "new Keynesian" Phillips curve.[2]

Neither of these two specifications, however, seems adequate to capture the behavior of inflation in actual economies. The acceleration Phillips curve fails to capture the fact that individuals and firms do not form their expectations about inflation in a rigid and mechanical manner. For instance, it is well documented that inflationary expectations can be drastically altered by a sharp change in macroeconomic policy.[3] On the other hand, the new Keynesian Phillips curve fails to capture the fact that inflation is highly persistent. According to it firms completely front load changes in prices in response to "news" about future profits. Empirical studies do not validate this prediction. Several recent studies which seek to estimate Phillips curves of this type find that they fit the data poorly (see e.g., Fuhrer and Moore, 1995; Fuhrer, 1997; Gali and Gertler, 1999; Roberts, 2000). Evidence from VAR studies also show that the response of inflation to shocks is "hump-shaped" rather than front loaded.

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[1] For recent examples of papers which specify the Phillips curve in this manner, see Ball (1997) and Svensson (1997a).

[2] For examples of papers which use this specification of the Phillips curve, see Roberts (1995) and Woodford (2003, Chapter 3).

[3] For a particularly dramatic account of this, see Thomas Sargent's essay, "The Ends of Four Big Inflations," in Sargent (1993).