

Chapter 3

A New Keynesian Phillips Curve for South Africa

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ABSTRACT

In South Africa, as elsewhere, economists have not reached an agreed upon model for the Phillips curve, despite its importance for understanding the process of inflation and its relevance for policy makers. It has been a particular challenge to identify the role of aggregate economic activity in the inflationary process in the South African literature, since the breakdown of a reasonably traditional Phillips curve, which had existed until the early seventies. A comparatively new model of the Phillips curve, often called the New Keynesian Phillips Curve (NKPC), has recently received considerable interest and support from monetary economists. The South African literature is exceptional in that these models have not yet been applied locally, despite their close association with forward looking and rules-based monetary policy regimes such as the inflation-targeting regime of the South African Reserve Bank. This chapter takes a first step towards introducing the NKPC in the South African debate, by estimating standard, hybrid, and open economy versions of the model and comparing the results with the international literature as well as South African precedents. The authors find encouraging, though tentative, evidence that research along these lines might help to identify the impact of aggregate economic activity in the domestic process of inflation.

1. INTRODUCTION

The time varying impact of a change in monetary conditions on real output and the aggregate price level is central to the challenge of monetary policy. Changes in the stance of monetary policy have their first impact on real variables in the economy (output and employment), sometimes summarized

as a non-vertical short run Phillips curve, but in the longer run the impact falls mainly on the aggregate price level. Awareness of this pattern is as old as economics' as a separate field of study, and David Hume's remarkable mid-eighteenth century description thereof is frequently quoted (for example, Brunner and Meltzer, 1976; Lucas, 1995). And yet, despite considerable attention and

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the importance of the issue for monetary policy, we have not reached an agreed upon model for the Phillips curve (Mankiw, 2001). Indeed a mistaken view of this relationship—the idea of a permanent trade-off between inflation on one side and real output and employment on the other—has been responsible for much mischief in the design and implementation of monetary policy since the War (Friedman, 1968; Lucas, 1976; Romer and Romer, 2002).

A comparatively new model of the Phillips curve, often called the New Keynesian Phillips Curve (NKPC), has recently received considerable interest and support from monetary economists. It has become especially important in recent policy models where the NKPC has become a “standard specification” (for example, Clarida et al., 1999; McCallum, 2001; Woodford, 2003). The South African literature is exceptional in that these models have not yet been applied locally, despite their close association with forward looking and rules-based monetary policy regimes such as the inflation-targeting regime of the South African Reserve Bank. This paper takes a first step towards introducing the NKPC in the South African debate, by estimating a standard version of the model and comparing the results with the international literature as well as South African precedents.

Section 1 of the paper provides a theoretical introduction to the NKPC. This is followed by a survey of the South African Phillips curve literature, as a benchmark for the results derived in the following text. The data and method used in the empirical estimation are described in section 3 and the results of this estimation in section 4.

2. THE NEW KEYNESIAN PHILLIPS CURVE

In the New Keynesian tradition nominal rigidities (which yield a non-vertical short run aggregate supply curve and non-vertical short run Phillips curve) are built on rational decision theoretic

foundations (Mankiw, 2001). The NKPC is a linear approximation to a dynamic stochastic general equilibrium with nominal rigidities and rational expectations (Walsh, 2003). These features, the forward-looking and rational expectations and the general equilibrium and decision theoretical foundations allows the NKPC a role in policy analysis which has been closed to more traditional specifications since Lucas’s telling critique of econometric policy evaluation (Lucas, 1976).

While both labor and goods markets can give rise to nominal rigidities, NKPC derive nominal rigidities in goods markets following the monopolistic competition framework (Dixit and Stiglitz, 1977), as applied by Taylor (1980), Rotemberg (1982), and especially Calvo (1983). It is the latter’s pricing model that has had the greatest influence on the NKPC literature. Following Calvo (1983) the typical NKPC derivation assumes forward-looking households and firms in a monopolistic setting and usually abstracts from capital accumulation. Price adjustments are time-contingent in the Calvo model with a fraction $(1 - \theta)$ of firms given the opportunity to change their output price every period, with the knowledge that this new price will be fixed over an uncertain horizon. The average firm’s price is therefore fixed for $1/(1 - \theta)$ periods. The aggregate price level, p_t in period t , is given by Equation 1:

$$p_t = \theta p_{t-1} + (1 - \theta) p^* \quad (1)$$

where p^* is the optimal price chosen by firms able to reset their prices. Because the firm’s optimisation problem is dynamic and forward-looking, the optimal price can be shown to be a mark-up on a distributed lead of expected marginal costs as shown in Equation 2:

$$p^* = (1 - \beta\theta) \sum_{i=0}^{\infty} (\beta\theta)^i E_t [\hat{\varphi}_{t+i}] \quad (2)$$

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