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The new Keynesian Phillips curve: An update on recent empirical advances[☆]



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ABSTRACT

This paper presents a comprehensive review of the newly emerging literature on the New Keynesian Phillips Curve (NKPC). The theoretical predictions, econometric estimation techniques as well as the corresponding empirical evidence are discussed focusing on both the closed economy and the open economy versions of the NKPC. A number of important findings are reported about the ability of NKPC to explain the process of inflation dynamics. First, there is weak support for the open economy version of the NKPC to be able to track inflation dynamics if imported inputs are used in the production process. Second, the NKPC describes inflation dynamics across sectors if microeconomic and sectoral level data are used. Further, the survey data employed as a proxy for inflation measure in the newer studies provide enhanced support to the closed economy NKPC with the sign, size and statistical significance of coefficients in line with the theoretical predictions. We provide fresh empirical evidence to check the first finding from the review. The deep structural parameters for four different versions of the NKPC, the pure forward looking NKPC, the Gali and Monacelli's (2005) NKPC, the open economy NKPC and the open economy hybrid NKPC, are estimated for Australia, Canada, New Zealand and the United Kingdom. These estimated coefficients show some support that the specifications of open economy NKPC, which incorporate prices of imported goods as opposed to the terms of trade and real exchange rate, seems to be a better, however, weak indicator of the inflation dynamics. These findings may have important policy implications.

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1. Introduction

This paper presents an extensive review of the recent empirical advances in estimating the New Keynesian Phillips Curve (NKPC). The NKPC, which relates inflation process to the expected future inflation and a measure of the real economic activity like the output gap, has been widely debated in the literature due to its mixed performance in explaining the inflation dynamics across a number of advanced countries. The deliberations over the usefulness of NKPC incorporate, among other issues, the use of closed economy versus the open economy versions of the NKPC, the forward looking versus hybrid versions of the NKPC, the empirical proxies employed to measure the output gap and inflation as well as potential endogeneity problems in estimating the NKPC.

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A corpus of new studies, especially in the last decade, is bringing in some fresh perspectives into the working and influence of NKPC in the academic and policy domain. A number of these papers focus on the open economy versions of the NKPC and try to disentangle the effect of imported products on domestic inflation. Some other studies use micro-level disaggregated and sector level data as well as survey based inflation measures to re-estimate the empirical performance of the NKPC as proposed in the theory. Quite a few papers explore the globalization angle and investigate if there is any relationship between globalization and inflation within the ambit of the NKPC. However, till date, there is no systematic review of these newer studies on the NKPC. The key aim of this paper is to fill this gap. We carefully evaluate the emerging stock of knowledge and discuss the lessons to be learnt from this new wave of research. Further, we provide empirical estimates for different versions of the NKPC for four advanced economies and show that there is some weak support for the open economy NKPC in line with the recent evidence.

Keynes and his ideas dominated the macroeconomic thought process from the 1929's Great Depression until the early 1970s. Rising unemployment in the 1970s became a major policy problem and the Keynesians were baffled to explain the simultaneous rise in inflation and unemployment (stagflation) within their framework. Their argument was mainly based on the assumptions that changes in aggregated demand yield changes in output with sluggish adjustment of prices and wages in the product and factor markets. The money wage was treated as exogenous while it was believed that whenever the aggregate demand exceeded the aggregate supply, it would generate inflation in the economy. The idea of nominal rigidities in the product and factor markets was not based on microeconomic foundations, and the classical economists questioned these nominal frictions, which further reduced the popularity of Keynesian macroeconomics in policy circles.

For Keynesians, the main intellectual challenge was to provide the microeconomic foundations to these nominal rigidities in the presence of rational expectations. In this context, many important contributions were made in the form of asymmetric information, staggered contracts, efficiency wage hypothesis and the new Keynesian Phillips Curve in the late 1970s and the late 1980s.

The NKPC is one of those contributions, which lay down the microeconomic foundations to Keynesian macroeconomics. It assumes expectations of inflation are rational and prices are sticky where the role of future price expectations in setting prices cannot be ignored. It is based on the theoretical contributions of Taylor (1980); Rotemberg (1982) and Calvo (1983), which retain the assumptions of nominal rigidities to explain inflation. These theoretical models, as Roberts (1995) points out present a common relationship, called the New Keynesian Phillips Curve, which relates inflation process to the expected future inflation and a measure of the real economic activity like the output gap.

The NKPC is different from the earlier Phillips Curve, as originally proposed by Phillips (1958)¹ which posited a trade-off between money wage changes and unemployment over the time period 1861–1957 for the United Kingdom. Samuelson and Solow (1960) then tested the Phillips curve for the United States and found that the money wage growth and unemployment relationship for the US was similar to that of the Phillips's results for the UK.

The NKPC assumes that the expectations of inflation are rational instead of adaptive. As a result, it is different from the expectations-augmented Phillips Curve, developed by Friedman (1968) and Phelps (1968). Further, the NKPC also differs from the renowned 1970s Lucas supply curve and the Phillips Curve, as developed in Lucas and Rapping (1969). The Lucas and Rapping (1969) version of the Phillips Curve under rational expectations suggests only unanticipated inflation (changes in money supply) can affect the output while the neutrality of money (i.e., money does not affect real fundamentals like output and employment) holds.² It also restricts inflation expectations to the current time period.

The NKPC, on the other hand, suggests that it is the future expectations of inflation that determine current inflation. In particular, the features of nominal rigidities distinguish the NKPC from its counterparts, proposed by the classical economists. In this context, the absence of nominal rigidities in NKPC would yield the same new classical Phillips Curves, which assume instantaneous adjustment of wages and prices in the factor and product markets.

Given the popularity and significance of NKPC in theory and practise, it remains an active area of research both in academic and policy arenas. The theoretical microeconomic foundations and the inherent role of future price expectations render the NKPC a pivotal role in monetary policy making. These nominal rigidities in factor and product markets reflect monetary non-neutrality and make the NKPC useful in conducting monetary policy. As a result, it has been empirically tested and widely debated in the literature over the last two decades. Rudebusch and Svensson (2001) and Fuhrer (1995) are among the prominent studies discussing the empirical evidence of the Phillips Curve. Recently, Gordon (2011) provides an overview of the history of the Phillips curve.

In spite of the NKPC's strong theoretical underpinnings, the empirical validity of NKPC in explaining the process of inflation dynamics is widely criticized. For instance, the theoretical predictions of NKPC, which suggest a boost in the level of output in response to anticipated disinflation, contradict the anecdotal and historical evidence. The response of inflation to monetary policy is observed to be gradual at best and researchers, on the other extreme, find disinflations causing economic recessions (e.g. Ball, 1994; Mankiw, 2001; Mankiw & Reis, 2002).

Contrary to the theoretical predictions of NKPC, the data also reveal that the current output gap, the main driving force variable, co-moves positively with the future inflation rate. The coefficient on current output gap turns out to be incorrectly signed (negative) and statistically insignificant (Gali & Gertler, 1999). The NKPC should also contain lagged inflation in its theoretical structure, which suggests a lack of inflation inertia (Fuhrer & Moore, 1995).

¹ See Sleeman (2011) for details and an autobiography of Phillips.

² See Bull & Frydman (1983) for discussion of the Lucas Phillips Curve.

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