Inflation Dynamics and the Role of the New Keynesian Phillips Curve: Evidence from India

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Abstract

Indian inflation dynamics, with an emphasis on how the New Keynesian Phillips Curve (NKPC) can be used to understand inflationary tendencies in the Indian economy. A key part of contemporary macroeconomic theory is the NKPC, which places an emphasis on the connection between inflation and actual economic activity via expectations and future-oriented actions. Considering important variables including production gaps, inflation expectations, and real marginal costs, this study empirically analyses the applicability of the NKPC in India's inflation dynamics using time-series data spanning several decades. In a country like India, where the economy is very open, global factors like changes in commodity prices and exchange rates impact the inflationary process. Although the NKPC is a good starting point for investigating inflationary pressures in India, it is critical to include other factors, such as structural rigidities, foreign influences, and shocks on the supply side, when attempting to decipher the correlation between inflation and economic activity, contributes to the larger discussion of inflation dynamics in developing economies and provides policy recommendations for controlling inflation expectations within the specific framework of India's economy, the necessity of doing additional studies to address the unique difficulties faced by developing nations by enhancing the NKPC model.

Keywords: Inflation Dynamics, New Keynesian Phillips Curve (NKPC), Inflation Expectations, Output Gap, Real Marginal Costs

Introduction

Because of its impact on GDP, social welfare, and economic stability, inflation continues to be a major obstacle for developing economies. As a nation that has seen both rapid economic growth and external economic shocks as well as shifting global conditions, India has made controlling inflation a key objective of its monetary policy. Since the Reserve Bank of India (RBI) has made limiting inflation a top priority, it is critical that policymakers have a firm grasp of the variables that contribute to inflation in India. From demand-driven inflation to supply-side shocks, and with the added difficulty of keeping inflation expectations in check in an unpredictable global context, India has encountered a wide range of inflationary pressures



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throughout the years. The New Keynesian Phillips Curve (NKPC) is a prominent tool for contemporary macroeconomists to examine the dynamics of inflation. Inflation is caused by three factors: real marginal costs, the production gap, and forward-looking expectations, according to the NKPC, which shows a relationship between economic activity and inflation. Inflation is better understood through the NKPC's emphasis on expectations and economic fundamentals, as opposed to the more static Phillips Curve, which implies a stable trade-off between inflation and unemployment, this article examines the NKPC's function in elucidating the dynamics of inflation in India, specifically looking at how effectively it handles the intricate relationship that exists among real marginal costs, expectations, output gaps, along with inflation. This research aims to shed light on the NKPC's applicability to India's distinct economic setting by using a time-series analysis on the country's inflation statistics. The study also delves at the ways in which supply-side shocks, changes in exchange rates, and global commodity prices impact inflationary pressures in India's highly linked economy. The Indian inflationary process and offer suggestions for better monetary policymaking that takes into account both internal and external variables. The work is also meant to add to what is already known about inflation dynamics in developing countries, where these markets' patterns of correlation between inflation and economic activity differ from those in developed nations. This study provides the Reserve Bank of India (RBI) and other policymakers with results that are relevant to their work in managing inflation in fast emerging economies by analysing how the NKPC applies to India's economy.

Modeling Inflation in India: Application of the NKPC

A contemporary paradigm for comprehending the dynamics of inflation, the New Keynesian Phillips Curve (NKPC) incorporates expectations and the connection among inflation, economic activity, and marginal costs. The NKPC is based on the central premise that inflation is affected by both the present and future expectations of inflation, in addition to the production gap and marginal costs. applying the NKPC to India's economy, investigating how well it can track inflation and what causes it in a dynamic, open economy like India's, which is growing at a rapid pace.

Data and Methodology: Time-Series Analysis

Using time-series data spanning several decades, this paper empirically analyses the effect of the NKPC in the inflation dynamics of India. The main sources of information for this study include key economic indicators, official inflation statistics released by the Reserve Bank of India (RBI), and the Ministry of Statistics and Programme Implementation. A wide range of macroeconomic factors are included in the dataset, including:

- Inflation rate: The inflation rate is calculated using the Consumer Price Index (CPI).
- **Output gap**: The demand-driven pressures on the economy are represented by the difference between the actual and potential GDP.
- **Real marginal costs**: Commonly estimated using production costs or unit labour costs modified for increases in productivity.



Inflation expectations: Information gathered from surveys and indicators of future trends, including the expectations survey conducted by the RBI and market-based metrics such as breakeven inflation rates.

In order to examine the dynamic links between inflation and the explanatory variables within the NKPC framework, econometric tools like the Generalised Method of Moments (GMM) and the Vector Autoregression (VAR) model are used to analyse the time-series data.

Theoretical Framework: New Keynesian Phillips Curve

The NKPC is typically expressed as follows:

 $\pi t = \beta E[\pi t+1] + \lambda y t + v t pi_t = \beta E[\pi t+1] + \lambda y t + v t = \beta E[\pi t+1] + \lambda y t + v t$

Where:

- $\pi t pi_t \pi t$ is the inflation rate at time ttt,
- $E[\pi t+1] \setminus E[\pi t+1] E[\pi t+1]$ represents expected future inflation,
- yty_tyt is the output gap, capturing demand-side pressures,
- vt\nu_tvt is a cost-push shock (such as changes in oil prices or wages),
- β \beta β and λ \lambda λ are parameters that measure the responsiveness of inflation to expectations and the output gap, respectively.

For the Indian context, the model is expanded to incorporate other variables that impact inflation, especially the impact of external shocks like changes in global commodity prices (such as food and oil prices), variations in exchange rates, and structural limitations. The influence of these factors on inflation, which cannot be explained by domestic economic conditions, is captured in the error term (vt/nu_tvt).

Estimation of the NKPC for India

As mentioned before, the time-series data is used to estimate the NKPC model. The potential GDP technique determines the output gap by extrapolating from a trend growth model that accounts for business cycle volatility. Unit labour costs, which include the cost of production per unit of output after adjusting for changes in productivity, are used as a proxy for real marginal costs. A component that looks ahead is inflation expectations, which are based on polls conducted by the RBI and market predictions.

As a dynamic panel estimation method, Generalised Least Squares (GLS) is used to estimate the NKPC parameters. Inflation in India can be better understood using this method, which takes into consideration both immediate and distant factors. Next, the computed coefficients are used to comprehend the impact of inflation expectations and economic activity on inflation in India. This impact is evaluated by the output gap and real marginal costs.

Key Variables: Output Gap, Inflation Expectations, and Real Marginal Costs

• **Output Gap**: The NKPC relies heavily on the production gap as a gauge of demanddriven economic pressures. Inflationary pressures arise when demand exceeds supply, which happens when the actual output exceeds the potential output. A number of



variables, including investment cycles, changes in external demand, and economic growth, impact the output gap in India.

- Inflation Expectations: A large component of inflation expectations is concerned with the future and has a substantial impact on actual inflation. A self-fulfilling prophecy can be formed when companies and individuals alike anticipate future inflation to be higher and respond by altering current pricing and wages accordingly. Important for NKPC estimation, these expectations are shed light on by surveys conducted by the Reserve Bank of India and forward-looking market indicators.
- **Real Marginal Costs**: After accounting for changes in productivity and labour costs, real marginal costs show how much it really costs to produce more units of output. The supply-side inflationary pressures on the economy are determined in large part by these costs. Inflation in India is driven by wage increases, raw material price increases, and energy cost rises, all of which push marginal costs upward.

Key Findings and Insights

The NKPC appears to be a helpful paradigm for comprehending the dynamics of inflation in India based on preliminary findings. There is a strong correlation between inflation and the output gap, suggesting that demand-side forces are the primary forces behind price increases. It is also discovered that inflation expectations have a significant role in determining current inflation, lending credence to the idea that actions taken in the future affect the results of inflation. Nevertheless, the study also shows that inflation is heavily influenced by external shocks, such as changes in the currency rate and global commodity prices. This suggests that the NKPC cannot adequately explain the dynamics of inflation in an open economy like India's on its own.

Conclusion

The New Keynesian Phillips Curve (NKPC) is used to analyse the dynamics of inflation in India, offering theoretical and empirical data on the elements that drive inflation in a growing economy. The importance of real marginal costs, the output gap, and inflation expectations in shaping inflationary patterns has been brought to light through the NKPC framework's application. Consistent with the NKPC's central tenet, inflation expectations substantially impact India's actual inflation results as of late, the results highlight the prospective character of inflation behaviour. Although the production gap is still a major component in inflation, the empirical study shows that other factors, like changes in exchange rates, supply-side shocks, and global commodity prices, also play a role. These extraneous elements make it harder to use the NKPC in a free market economy like India's, implying that other variables need be considered in order to completely understand inflation dynamics. The dynamic nature of inflation in India, influenced by both local and international economic factors, is well-reflected in the model's focus on anticipation and proactive actions. The findings also show that the Reserve Bank of India's (RBI) inflation targeting strategy can be improved by studying these processes, especially when it comes to controlling inflation expectations and reacting to outside



shocks. Policymakers in India will need to be adaptable and use a combination of inflation targeting and other instruments to keep prices stable, since the NKPC isn't a panacea for the country's inflationary process. To sum up, the NKPC is a great tool for studying inflation dynamics in India, but it needs some tweaking to fit the needs of a developing market economy. The results highlight the need for better management of both internal and external factors that contribute to inflation, and they also point the way towards potential future research directions, such as improving inflation models to take into consideration the specific structural and external factors that impact inflation in emerging markets like India's. To better predict and control inflation in the context of worldwide volatility, future research might investigate combining several models or using hybrid methodologies.

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