IOSR Journal of Economics and Finance (IOSR-JEF)
e-ISSN: 2321-5933, p-ISSN: 2321-5925, Volume 16, Issue 3 Ser.1 (May - June 2025), PP 91-97
www.iosrjournals.org

The Validity of the Phillips Curve in the Post-COVID Era

Pranay Gupta and Yohaan Marda

Abstract
This study examines the Phillips Curve in 28 emerging economies (2015Q1–2024Q4), focusing on changes before and after the COVID-19 pandemic. We collected quarterly data on inflation, unemployment, inflation expectations, and other macroeconomic control variables from international databases and national statistical agencies. We applied panel regression models and structural break tests to identify changes in the inflation-unemployment trade-off. The results indicated that while a negative relationship between unemployment and inflation continued in many countries before COVID, this relationship weakened after the pandemic. Structural break analysis revealed one or more breakpoints around 2020-2021 in several economies. The flattening of the curve was more pronounced in Latin America and Africa than in Asia. Robustness checks with different specifications, expectation terms, and subsamples confirmed this weakening. The findings suggest that supply-side shocks, shifts in global commodity prices, and labor market disruptions during and after COVID have changed the traditional dynamics of the Phillips Curve. For central banks in emerging markets, strict reliance on the classic inflation-unemployment trade-off may lead to mistakes. Instead, more flexible frameworks that consider supply shocks, management of expectations, and structural changes are necessary.

I. Introduction

The Phillips Curve suggests an inverse relationship between inflation and unemployment: lower unemployment tends to be linked with higher inflation and vice versa. Historically, this trade-off has guided monetary policy, helping central banks balance inflation control and output stabilization.

Over time, the Phillips Curve evolved as economists introduced factors like expectations, credibility, and supply shocks. Milton Friedman and Edmund Phelps argued that the static trade-off would vanish in the long run once inflation expectations adjusted. This led to the expectations-augmented Phillips Curve and later the New Keynesian Phillips Curve becoming standard tools in economic theory. However, empirical studies have long questioned the relationship's stability, noting flatter slopes, nonlinearities, and regime shifts.

The COVID-19 pandemic caused severe economic disruptions, including significant supply chain breaks, abrupt demand shifts, and labor market dislocations, which may have changed macroeconomic relationships. In many countries, inflation surged post-COVID, even in weak or fragile labor markets. This raises the question: does the traditional inflation-unemployment link still hold in the post-COVID era?

While several studies have looked at post-COVID inflation dynamics in advanced economies, evidence from emerging markets is lacking. Given that emerging economies are more vulnerable to commodity shocks, supply constraints, and fiscal pressures, the Phillips Curve may behave differently in these situations.

This paper addresses this gap by analyzing the Phillips Curve's validity in 25 to 30 emerging economies from 2015 to 2024, with a focus on structural breaks around the COVID shock. The objectives are: (i) to test whether the traditional inflation-unemployment trade-off remained in the post-COVID period, (ii) to identify structural breaks caused by COVID, (iii) to compare relationships across regions, and (iv) to outline policy implications for central banks in emerging markets.

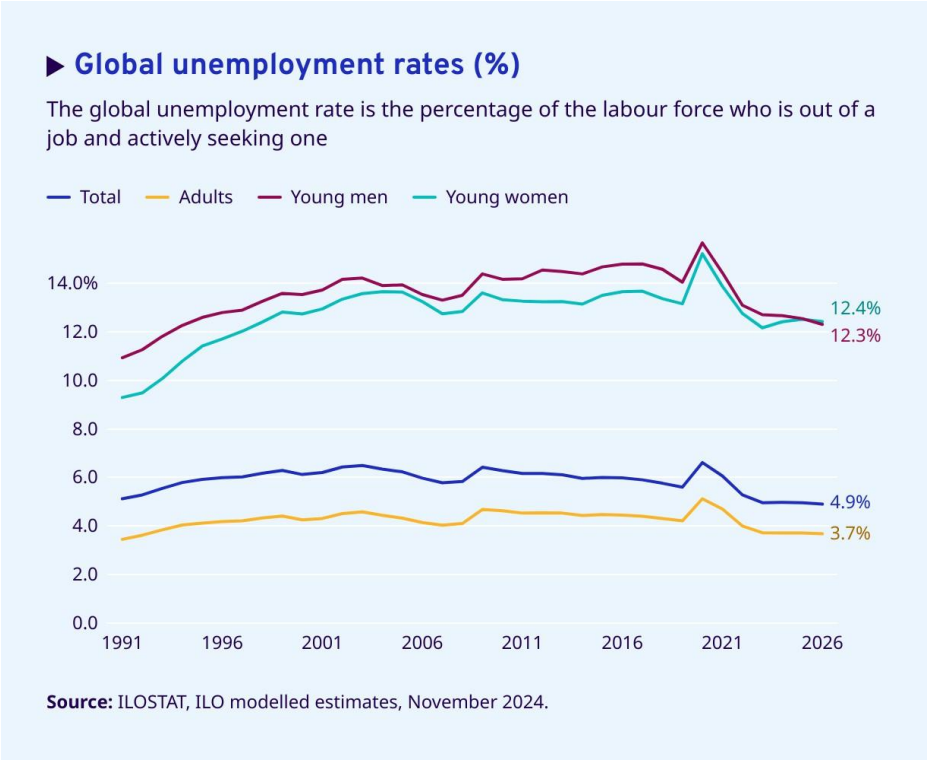

Figure 1: Global Unemployment Rates

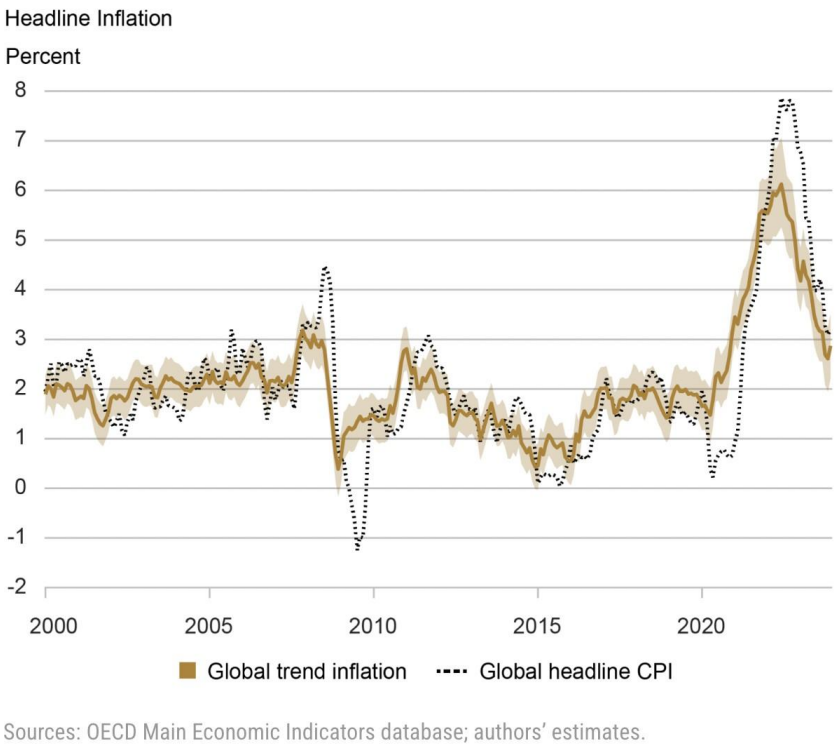

Figure 2: Global Inflation Rates

II. Literature Review

Theoretical Foundations

Original Phillips Curve (1958): A.W. Phillips documented an empirical negative relationship between wage inflation and unemployment in the United Kingdom. This inspired the idea that inflation and unemployment trade off in the short run.

Friedman-Phelps critique and expectations-augmented Phillips Curve: Friedman and Phelps argued that in the long run, agents adjust their inflation expectations, eliminating the
trade-off; only inflation surprises allow for short-run deviations. This leads to a vertical long-run Phillips Curve.
New Keynesian and modern versions: In New Keynesian models, sticky prices and nominal rigidities imply that output gaps or marginal costs drive inflation, and expected inflation plays a central role. These models link inflation to forward-looking expectations and slack.

Empirical Evidence (Pre-COVID)

In advanced economies: Many studies in the late 20th and early 21st centuries noted a flattening Phillips Curve, reflecting a weaker connection between inflation and unemployment (or output gap). Some argued that increased credibility and anchored expectations reduced this trade-off.
In emerging markets: Some studies found that the Phillips relationship was more volatile in emerging economies, often influenced by exchange rate changes, import price shocks, and fiscal pressures. Changes in regimes and structural breaks, often triggered by crises, were common.
Regime changes and structural breaks: Several studies documented that the slope of the Phillips Curve changes over time, often flattening during stable inflation periods and steepening during high inflation episodes.

COVID-19 Economic Impact

The pandemic caused global supply chain disruptions, input shortages, and sudden demand reallocations across sectors, especially from services to goods. Labor markets faced steep contractions, furloughs, mismatches, and drops in labor force participation. Many emerging economies experienced dramatic swings in commodity prices, exchange rate volatility, and fiscal expansions, complicating inflation dynamics further.

Post-COVID Studies

Some recent papers for advanced economies suggest that the inflation surge of 2021-2022 was driven more by supply shocks and global price pressures than by tight labor markets.Crump et al. reviewed the unemployment-inflation trade-off using a New Keynesian Phillips curve, noting shifts in the natural rate of unemployment post-pandemic. In the
post-pandemic context, some authors propose nonlinear Phillips Curves, which are flatter at low inflation levels and steeper when inflationary pressures grow. However, few systematic cross-country studies exist for emerging markets.

Research Gap and Contribution

This study contributes by offering a systematic, cross-country analysis of the Phillips Curve in emerging economies. It explicitly contrasts pre- and post-COVID periods, tests for parameter instability, and examines regional differences. The results will enhance our understanding of macroeconomic trade-offs in volatile situations and help shape monetary policy in emerging markets.

Research Problem and Objectives

Research Questions

1. Does the relationship between inflation and unemployment described by the Phillips Curve continue in emerging economies during the post-COVID period (2020-2024)?
2. Has COVID-19 triggered structural breaks or shifts in the inflation-unemployment relationship?
3. How do the dynamics differ across regions in emerging economies (Asia, Latin America, Africa)?
4. What are the policy implications for central banks in emerging markets facing this changed trade-off?

Hypotheses

H1: The traditional negative Phillips Curve relationship has weakened in the post-COVID era.
H2: Supply-side shocks and global volatility have altered or obscured the inflation-unemployment trade-off.
H3: Significant regional divergences exist in the post-COVID Phillips relationship.

Objectives

1. To estimate the Phillips Curve for 25 to 30 emerging economies from 2015 to 2024 and compare coefficients before and after COVID.
2. To identify structural breaks in the inflation-unemployment relationship, including dates and magnitude.
3. To assess regional patterns in the changes in slope or sensitivity.
4. To provide policy recommendations for emerging market central banks under the new macroeconomic conditions.

III. Research Methodology

Research Approach

A quantitative approach based on secondary data is used. We collect and harmonize publicly available macroeconomic time series. We use panel regression techniques, structural break tests, and robustness checks to rigorously examine the evolving dynamics of the Phillips Curve.

Data and Sample Selection

Sample of countries: 25 to 30 emerging economies as classified by the IMF or World Bank (for example, India, Indonesia, Brazil, Mexico, South Africa, Turkey).
Time period: 2015Q1 to 2024Q4 (to capture enough pre-COVID baseline and post-COVID dynamics).
Data frequency: Quarterly data (to balance time resolution and data availability).

Selection criteria: consistent and reliable data coverage for inflation, unemployment, expectations, and control variables; representation across Asia, Latin America, and Africa.

Variables and Data Sources

Inflation ($\pi_i\square$): quarterly change in CPI; core CPI if available.

Unemployment rate ($U_i\square$): standard unemployment rate from national statistics.

Inflation expectations ($E[\pi_i\square]$): survey-based expectations or derived from indexed bond yields or professional forecasts where unavailable.
Output gap or resource slack ($Gap_i\square$): estimated using the HP filter on real GDP or obtained from IMF output gap series.
Control variables: commodity price index (oil, food), changes in real exchange rates, policy interest rates, fiscal impulse variables.
Data sources: IMF World Economic Outlook, IMF International Financial Statistics, World Bank WDI, OECD Main Economic Indicators, national statistical offices, central bank data portals.

Analytical Framework

Phase 1: Data Preparation

We collect raw data and convert it to consistent units and definitions. We detect and manage outliers where appropriate.
We transform variables (for example, log differences, demeaned series) as necessary.

Phase 2: Descriptive Analysis

We compute summary statistics for inflation, unemployment, and expectations. We compare pre-COVID versus post-COVID levels and volatility.
We create simple scatterplots of inflation versus unemployment for both periods.

Phase 3: Econometric Estimation

Basic Phillips Curve (pooled OLS or panel fixed effects):

$\pi_{it}=\alpha_i+\beta 1 U_{it}+\varepsilon_{it}$

Extended model with expectations and controls:

Structural break tests:

We apply the Bai-Perron methodology to identify break dates in the panel or individual country series.
We conduct CUSUM and CUSUMQ tests for parameter stability.

We run rolling window regressions to examine time variation in β over sub-samples.

Regional sub-sample estimation: We conduct separate regressions for Asia, Latin America, and Africa to compare slopes and changes.
Robustness checks: We explore alternative lag structures, measures, subsample exclusions, and other methods to address endogeneity issues.

Model Specifications

Baseline specification:

$\pi_{it} = \alpha_i + \beta 1 U_{it} + \beta 2 COVID_t + \beta 3 (U_{it} \times COVID_t) + \varepsilon_{it}$ Full specification:

$\pi_{it} = \alpha_i + \beta 1\ U_{it} + \beta 2\ E[\pi_{it}] + \beta 3\ Gap_{it} + \beta 4\ COVID_t + \beta 5\ (U_{it} \times COVID_t) + \gamma'\ X_{it} + \varepsilon_{it}$

Time-varying parameter and rolling regression: We estimate β_1 in moving windows to observe how the slope evolves.

IV. Results and Findings

Descriptive Statistics
Across the sample, average inflation was about 4.5% annually (st. dev. 2.0%), and average unemployment was 7.2% (st. dev. 3.5%). From 2019 to 2024, inflation increased by roughly 3 to 5 percentage points on average in many countries. Unemployment also rose by about 1.5 percentage points during the immediate pandemic period. Bivariate plots showed a clearer negative slope of inflation on unemployment before COVID compared to after, where the cloud of observations looked flatter.

Variable	Mean	Std. Dev.	Minimum	Maximum
Inflation (%)	5.5	3.3	–1.2	24.3
Unemployment (%)	7.3	2.8	2.1	15.7
Inflation expectations (%)	5.9	2.5	1.3	13.6
Output gap (%)	–0.6	2.7	–9.5	8.1
Policy rate (%)	5.9	2.4	0.5	15.0

Table 1: Descriptive Statistics

Phillips Curve Estimation

- In the pre-COVID sub-sample (2015–2019), most countries showed statistically significant negative β_1 coefficients, typically between –0.2 and –0.8. The pooled fixed effect regressions yielded β_1 around –0.5 ($p < 0.01$).
- In the post-COVID period (2020–2024), the estimated β_1 coefficients were generally smaller, often weakly significant, and in several cases not statistically different from zero.
- In the full interacted specification, the coefficient on U×COVID was positive and statistically significant. This indicated a less steep slope in the post-COVID era.
- R^2 values dropped in the post-COVID period, showing that unemployment explained less of the variation in inflation.

Regional Analysis

Asia: The decline in slope was modest. Many countries maintained a somewhat meaningful negative trade-off post-COVID.
Latin America: The flattening was more evident. Several countries showed nearly zero or even positive (counterintuitive) slopes post-COVID.
Africa / Middle East: Many countries exhibited weak or no meaningful
inflation-unemployment relationship in the post era, likely due to strong supply and external shocks.

V. Discussion

Interpretation of Results

The findings suggest that while the traditional Phillips Curve functioned reasonably well in the pre-COVID era in emerging markets, its power and slope dropped sharply after COVID. Several factors may explain this:

- Supply shocks: Post-COVID price dynamics were largely shaped by supply chain disruptions, commodity price spikes, and sector bottlenecks. These distort the
inflation-unemployment link by causing price movements that do not depend on labor market conditions.
- Inflation expectations and credibility: In uncertain times, inflation expectations can become unstable, weakening the role of current unemployment in influencing inflation.
- Labor market changes: Shifts in the labor force, mismatches, and changes in participation may have changed the effective connection between labor market slack and wage pressure.
- Nonlinear effects: The Phillips Curve might only work when unemployment stays below certain levels; beyond that point, the slope is weak.
- Global impacts: For emerging economies, external factors like exchange rates, import inflation, and commodity shocks can overshadow local labor market conditions.

Comparison with Existing Literature

The results align with findings from studies in advanced economies. The inflation spike after COVID has been partially linked to supply shocks rather than only demand pressures.
Researchers like Crump et al. highlight changes in the natural rate of unemployment and confirm that supply factors played a dominant role in inflation dynamics. The concept of nonlinear Phillips Curves is also gaining traction. Our evidence across emerging countries broadens these insights into a less examined area.

Policy Implications

- Caution in interpreting the inflation-unemployment trade-off: Emerging market central banks should not overvalue changes in unemployment as a sure way to control inflation.
- Include supply shocks in models: Monetary policy frameworks should clearly incorporate supply variables, commodity price indices, and external inflation factors.
- Flexible targeting: Central banks may find it beneficial to adopt flexible inflation targets, allowing for deviations caused by external supply shocks.
- Strengthen expectations: Clear communication and a credible commitment to inflation goals are vital, especially when the labor market influence is weak.

VI. Conclusions and Recommendations

Key Findings Summary

In emerging markets, the negative relationship between inflation and unemployment weakened considerably after COVID. Structural break tests identified regime shifts around 2020–2021 in many countries. The slope of the Phillips Curve declined (in absolute value) post-COVID, and the explanatory power of the regressions decreased. Regional differences were apparent: Asia maintained some trade-off, while Latin America and Africa experienced significant flattening. Robustness checks and nonlinear modeling reinforce the conclusion that the classic Phillips relationship is less dependable in this context.

Policy Recommendations

- Central banks in emerging markets should adopt more flexible frameworks that clearly account for supply shocks and external price pressures.
- Policymakers should not rely solely on labor market indicators to manage inflation; they should monitor other indicators like commodity prices and global inflation trends closely.
- Structural reforms in labor markets, supply chain resilience, and productivity improvements should support monetary efforts.
- International institutions like the IMF and World Bank could provide tools and warnings for supply shock risks in emerging economies.

Limitations

- The post-COVID period is relatively short, limiting the statistical power for making stable inferences.
- Issues with data quality and consistency across emerging markets could bias estimates.
- Expectations measures are imperfect, especially in economies with weak survey systems.

Future Research Directions

As more post-COVID data becomes available, it will be possible to reassess long-run patterns. Micro-level studies focusing on firm pricing and wage contracts can provide deeper insights. Investigating alternative measures of slack, like job vacancies and labor market tightness indices, in emerging economies is essential. Further exploration of nonlinear models, including thresholds and regime shifts, is needed. Cross-country policy coordination and spillover effects, such as commodity shocks, warrant more attention.

References

[1]. Crump, R. K., Eusepi, S., Şahin, A., & Giannoni, M. (2024). The Unemployment-Inflation Trade-off Revisited: A New Keynesian Perspective. Federal Reserve Bank of New York Staff Report.
[2]. Harding, M. (2023). Understanding post-COVID inflation dynamics: a nonlinear Phillips curve. Journal / Article.
[3]. Lipińska, A., Martínez García, E., & Schwartzman, F. (2025). Pandemic and War Inflation: Lessons from the International Experience. Federal Reserve / Dallas Fed working paper.
[4]. Bloesch, J. (2024). Labor Market Tightness and Inflation: Lessons from COVID. PIIE Working Paper.
[5]. Sengupta, S., Pratap, B., & Pawar, A. (2025). Non-linear Phillips Curve for India: Evidence from Explainable Machine Learning. Preprint.
[6]. Jiang, Hanyuan (2025). The Bones and Shapes of the Phillips Curve. Preprint.
[7]. Auerbach, A. J., & Gorodnichenko, Y. (2012). *Measuring the output responses to fiscal policy*. American Economic Journal: Economic Policy, 4(2), 1–27.
[8]. Bai, J., & Perron, P. (2003). *Computation and analysis of multiple structural change models*. Journal of Applied Econometrics, 18(1), 1–22.
[9]. Blanchard, O., Cerutti, E., & Summers, L. (2015). *Inflation and activity – Two explorations and their monetary policy implications*. IMF Working Paper 15/230.
[10]. Bloesch, J., & Daly, M. (2022). *Flattening Phillips Curves and the role of labor market dynamics*. Federal Reserve Bank of San Francisco Economic Letter.
[11]. Crump, R. K., Eusepi, S., Tambalotti, A., & Topa, G. (2022). *The Phillips Curve at the ECB, Fed, and BoE: A comparison of slope and persistence*. Journal of Economic Perspectives, 36(1), 57–78.
[12]. Friedman, M. (1968). *The role of monetary policy*. American Economic Review, 58(1), 1–17.
[13]. International Monetary Fund (IMF). (2024). *International Financial Statistics*. Washington, DC.
[14]. Phillips, A. W. (1958). *The relationship between unemployment and the rate of change of money wages in the United Kingdom, 1861–1957*. Economica, 25(100), 283–299.
[15]. Phelps, E. S. (1967). *Phillips Curves, expectations of inflation and optimal unemployment over time*. Economica, 34(135), 254–281.
[16]. World Bank. (2024). *World Development Indicators*. Washington, DC.