India Macroeconomic Analysis (2018–2024)

Executive Summary

This report examines the relationships among key macroeconomic indicators of India for the period 2018–2024 using data from the International Monetary Fund's World Economic Outlook database. The variables analysed include **Gross Domestic Product (GDP) Growth (constant prices), Consumer Price Index (CPI) Inflation, Unemployment Rate, and Government Total Expenditure as a percentage of GDP**.

Using multiple linear regression models and correlation analysis, the study investigates the effect of fiscal expenditure on economic growth and inflation, as well as testing the Phillips Curve hypothesis, which posits an inverse relationship between inflation and unemployment.

The analysis shows a statistically significant positive relationship between government expenditure and inflation, but an insignificant relationship between government expenditure and GDP growth. While the Phillips Curve's expected negative relationship between inflation and unemployment appears directionally correct, it is statistically insignificant, suggesting a weak or absent Phillips Curve in India during the study period.

Data Summary

Year	GDP Growth (%)	Inflation (%)	Unemployment (%)	Govt Expenditure (% GDP)
2018	6.45	3.41	8.90	26.3
2019	3.87	4.77	7.48	26.8
2020	-5.78	6.16	8.66	31.0
2021	9.69	5.51	7.36	29.9
2022	7.61	6.65	5.30	29.1
2023	9.19	5.36	4.94	28.4
2024	6.46	4.67	4.94	28.3

Correlation Analysis

The correlation heatmap indicates a strong positive relationship between Government Expenditure and Inflation (r = 0.80), and a moderate negative correlation between Government Expenditure and GDP Growth (r = -0.41). There is a weak and negative relationship between Unemployment and Inflation, suggesting limited evidence for the Phillips Curve in this period.

Regression Analysis

Model 1: GDP Growth ~ Government Expenditure

- Coefficient: -1.31 (not statistically significant, p = 0.36)

- R-squared: 0.17

- **Interpretation:** Government expenditure does not show a significant effect on GDP growth.

Model 2: Inflation ~ Government Expenditure

- Coefficient: 0.52 (**statistically significant**, p = 0.03)

- R-squared: 0.64

- **Interpretation:** Higher government spending is associated with increased inflation.

Model 3: Inflation ~ Unemployment (Phillips Curve)

- Coefficient: -0.19 (not statistically significant, p = 0.47)

- R-squared: 0.10

- **Interpretation:** The negative sign aligns with the Phillips Curve hypothesis; however, the relationship is weak and statistically insignificant. This indicates that the Phillips Curve relationship between inflation and unemployment is not strongly observed in India during this period.

Visualizations

- **Government Expenditure vs Inflation:** Displays a clear positive linear relationship.

- **Government Expenditure vs GDP Growth:** Shows a negative trend but statistically insignificant.

- **Phillips Curve (Inflation vs Unemployment):** Negative slope observed, consistent with theory, but statistically weak.

- **Macro Trends Over Time:** Highlights the decline in GDP Growth during 2020 due to the pandemic, followed by recovery alongside sustained government spending.

Interpretation and Conclusion

The analysis suggests that government expenditure has a significant impact on inflation but not on real GDP growth in India between 2018 and 2024. The Phillips Curve relationship, while theoretically consistent (negative slope), lacks statistical significance, indicating that inflationary trends in India may not be directly tied to labor market conditions during this period.

These results highlight the inflationary consequences of fiscal expansion without a corresponding short-term impact on output or unemployment reduction. Policymakers should balance the use of fiscal tools with potential inflationary pressures and consider structural labor market reforms to improve employment outcomes.

References

- International Monetary Fund (2024), World Economic Outlook Database.

- R version 4.5.0

- R packages: tidyverse, ggcorrplot, Metrics