

Analyzing Business Cycles in Azerbaijan: Application of Various Filters and Spectral Analysis

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Abstract

This study investigates the cyclical behavior of Azerbaijan's economy and its non-oil-gas sector through the application of various filtering techniques, including the Hodrick-Prescott, Baxter-King, and Christiano-Fitzgerald filters. Utilizing quarterly GDP data from Q1 2001 to Q4 2023, we analyze the volatility, cycle duration, and significant periods of economic growth and contractions. Our analysis reveals that the Hodrick-Prescott filter shows more pronounced and volatile cyclical components, while the Baxter-King and Christiano-Fitzgerald filters provide smoother and more moderated views. Spectral analysis, employing periodograms smoothed with Bartlett, Hamming, Hann, and Parzen kernel windows, identifies cycle durations ranging from 4.1 to 19.4 quarters for total GDP and 4.3 to 19.4 quarters for non-oil-gas GDP. We find that Azerbaijan's economy exhibits higher volatility compared to advanced economies, likely due to its dependence on oil exports and susceptibility to external shocks. Key periods such as the 2008 financial crisis and the COVID-19 pandemic significantly impacted economic performance, with notable declines identified across all filtering methods. The HP filter indicates a sharp and more prolonged downturn during these crises, whereas the BK and CF filters capture less prolonged and less severe impacts. This research provides a comprehensive understanding of Azerbaijan's business cycles, highlighting the importance of robust methodologies in economic analysis. Our findings contribute to the limited literature on Azerbaijan's economy and offer valuable insights for policymakers aiming to enhance economic stability and growth.

Keywords: Baxter-King filter, Christiano-Fitzgerald filter, economic fluctuations, Hodrick-Prescott filter, periodogram