Long-Term and Short-Term Dynamics Between Economic Growth, Fuel Price, and Transportation Demand

Fassil Fanta
Professor, Economics, Brenau University, United States

Scott Ertekin
Associate Professor, Marketing, Brenau University, United States

Abstract:

This study examines the dynamic relationships between revenue ton-miles (RTM), gross domestic product (GDP), and gas prices using time-series econometric techniques. The Augmented Dickey-Fuller (ADF) test was employed to assess the stationarity of the variables, revealing the presence of unit roots and indicating non-stationarity. The Johansen cointegration test confirmed the existence of a long-term equilibrium relationship among RTM, GDP, and gas prices. To capture both short-term fluctuations and long-run dynamics, a Vector Error Correction Model (VECM) was utilized, demonstrating that GDP has a strong positive impact on RTM, while gas prices exert a significant negative influence. Policy implications emphasize the need for strategic investment in transportation infrastructure, energy price stabilization, and supply chain resilience to mitigate economic volatility and enhance sectoral sustainability. These findings provide valuable insights for policymakers and industry stakeholders in optimizing economic and transportation policies to ensure long-term stability and efficiency.

Keywords:

Time-series, cointegration, VECM, economic growth, fuel prices, transportation demand.