

ABSTRACT

This study examines the causal relationships between economic growth, human development, population growth, and renewable energy in Indonesia from 1999 to 2023 using annual time-series data. The research applies Vector Auto Regression (VAR), Auto-Regressive Distributed Lag (ARDL), to assess both short- and long-term effects. VAR identifies causality, while ARDL measure equilibrium adjustments. The findings reveal no direct causal link between population growth and economic performance, while human development significantly drives economic growth. ARDL confirms that clean energy positively impacts economic growth in the long run. The ARDL ECM's negative and significant coefficient indicates equilibrium restoration over time. These results suggest that Indonesia should prioritize human capital investment and accelerate its transition to renewable energy. Policies should focus on energy efficiency and innovation to ensure long-term economic and environmental sustainability.

Keywords: Economic Expansion, Human Advancement, Demographic Growth, Renewable Energy, ARDL, VAR, Indonesia