Fishing Effort and Marine Fish Production in Sri Lanka: Evidence from a Dynamic Time Series Analysis

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Marine fisheries play a vital role in Sri Lanka's coastal economy by contributing to food security, employment generation, and export earnings. Despite the sector's economic importance, limited empirical evidence exists on the dynamic relationship between fishing effort and marine fish production in Sri Lanka, particularly under external shocks affecting coastal fisheries. This study addresses this gap by examining the short-run and long-run determinants of total marine fish production using annual time series data from 2000–2024. Fishing effort is measured using a composite proxy indicator constructed from artisanal fishing vessels and the total number of marine fishermen, capturing both capital capacity and labour participation within Sri Lanka's marine fisheries sector. Although total marine fish production includes production from multiple marine fishing segments, artisanal fisheries represent a dominant component of Sri Lanka's coastal marine fisheries sector. The study employs the Autoregressive Distributed Lag (ARDL) framework to estimate the relationship between marine fish production, fishing effort, and fish exports. The ARDL approach is considered appropriate due to its suitability for small sample sizes and mixed orders of integration among variables. The ARDL bounds test confirms the existence of a stable long-run equilibrium relationship among the variables. The estimated long-run coefficients indicate that fishing effort exerts a positive and statistically significant effect on marine fish production, suggesting that improvements in fishing capacity and labour participation contribute to higher fish harvests within the observed production system. However, sustained increases in fishing pressure beyond biologically sustainable harvesting levels may contribute to long-term resource depletion and declining fisheries productivity. Fish exports exhibit a negative long-run relationship with marine fish production, possibly reflecting structural differences between export-oriented species and total domestic marine catch composition. The error correction term is negative and statistically significant, indicating that approximately 53% of short-run disequilibrium is corrected within one year. In addition, the 2004 Indian Ocean Tsunami dummy variable demonstrates a significant negative impact on marine fish production. The findings emphasize the importance of strengthening fisheries governance, improving fishing efficiency, and enhancing coastal fisheries resilience to support sustainable marine resource management in Sri Lanka.

Keywords: *Marine fisheries, Fishing effort, ARDL model, Sri Lanka*