

## Fitting the Yield Curve of Iranian Government Islamic Securities: A Comparison of Nelson-Siegel and Spline Models

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### Abstract

The yield curve plays a pivotal role in assessing government financing costs, measuring risk, and forming interest rate expectations. As dependence on public debt rises, accurate yield curve estimation becomes increasingly critical. While previous empirical studies in Iran have focused exclusively on Islamic Treasury Bills (ITBs), this study estimates the yield curve using a combined dataset of ITBs and Government Murabaha Bonds (GMBs) through the Nelson-Siegel (NS), Nelson-Siegel-Svensson (NSS), and spline models. Incorporating GMBs enhances curve fitting, although ITBs alone provide adequate estimates. The Diebold-Mariano test indicates no significant differences among models when using only ITBs. However, with the combined dataset, the baseline model outperforms the spline approach, though without a statistically significant advantage over the Nelson-Siegel model. Collinearity is rejected for the NS specification but confirmed for the NSS model. Analysis of the level ( $\beta_0$ ) and slope ( $\beta_1$ ) factors reveals stationary dynamics, suggesting stable underlying processes. Given the limited maturity diversity and low trading volumes in Iran's debt market, the NS model is recommended for practical applications. Several policy measures—including issuing securities with broader maturity ranges, introducing short-term zero-coupon and long-term inflation-indexed instruments, publishing a transparent issuance calendar, and enhancing coordination between the Ministry of Economy and the Central Bank—would improve data quality, yield curve continuity, and monetary policy effectiveness.

**Keywords:** Yield Curve; Term Structure of Interest Rates; Islamic Treasury Bills (ITBs); Sovereign Sukuk; Government Murabaha Bonds (GMBs); Nelson-Siegel Model; Spline Estimation.

**JEL Classification:** E43, G12, C32, C14, G18.

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