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Volatility Of Interest Rates in The U.S. After Covid-19: A Multivariate GARCH Analysis

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Abstract

The U.S. Treasury market is a cornerstone of global finance, serving as a critical benchmark for pricing assets. During the pandemic, synchronized fiscal and monetary stimulus across major economies led to the most significant inflationary surge in decades. In response, Central Banks initiated an unprecedented monetary tightening. The Federal Reserve raised short-term interest rates from 0.00% to 5.25% p.a. (the highest level since the early 2000s) over a record timeframe (Mar-22 to Jul-23). Long-term rates and their volatility began to rise prior to this tightening, underscoring the need to examine their relationship with macroeconomic variables. This study examines the volatility dynamics of U.S. Treasury bonds from 1994 to 2024 with a focus on the macroeconomic shock induced by the Covid-19 pandemic. Using APARCH and DCC-GARCH models, we explore the interplay between conditional variance in long-term interest rates and key macroeconomic variables, highlighting asymmetric shocks, feedback effects, and spillovers between Treasury markets and macroeconomic volatility. The findings align with the Fed's dual mandate and reinforce the relationship between long-term rates, market expectations, and the term structure of interest rates. The results also meet theoretical models on the informational content of the term structure of interest rates and market expectations embedded in future rates. Practical insights are offered for risk management and investment strategies, emphasizing the importance of accounting for volatility asymmetries, interest rate risks tied to economic conditions, and downside risks in portfolio optimization.

Keywords: U.S. Treasury; APARCH; DCC-GARCH; Asymmetric Shocks; Volatility Spillover.