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Re-examination of the predictability of economic activity using the yield spread: a nonlinear approach

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Abstract

This paper examines the feasibility of using the term structure of nominal interest rates in empirical predictive relationships with future real activity growth serving as the dependent variable. In particular, we will focus on the strength and stability of the spread–output relationship. We employ smooth transition nonlinear models that can accommodate (a) regime switching type nonlinear behaviour and (b) time-varying parameters. We verify that the link exhibits strong threshold effects with respect to near past spread values implying that the relation is sufficiently strong in economic terms if past spread values did not exceed a positive threshold value. Furthermore, we are able to explicitly model time-variation in the preceding effects reaching the conclusion that the importance of the spread as an output predictor has been significantly diminished if not eradicated during recent years. The timing of the change in the information content of the spread appears to be related to a turn in certain monetary policy practices, in particular, the turn towards stronger inflation targeting practices.

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1. Introduction

Numerous authors have documented that the yield spread, the difference in yields between long-term and short-term interest-bearing securities, is a consistent predictor of real activity. A significantly positive relationship has been reported employing data for many different economies and for a variety of time periods in the post-war period (see, e.g., Estrella & Hardouvelis, 1991; Estrella & Mishkin, 1997; Plosser & Rouwenhorst, 1994; Stock & Watson, 1996). The predictive content of the term structure also appears robust to the inclusion of other financial variables such as real interest rates, central bank rates, real money supply or stock prices. Cozier and Tkacz (1994) also confirm that the predictive power of the spread is not simply a cyclical phenomenon that is endogenous to the business cycle since the spread predicts real GDP changes even when the output “gap” is introduced as an additional explanatory variable. One notable feature of the results is that the predictive content of the spread is more important in some countries than others.

In two recent papers, Estrella (1998) and Hamilton and Kim (2001) address the theoretical question of why the yield should forecast real activity. Hamilton and Kim show that the contribution of the spread can be decomposed into the effect of expected future changes in short rates and the effect of the term premium where the respective contributions differ. Estrella derives the reduced form relationship between changes in real output and the spread from a simple linear structural model of the economy. This model is of the type specified by Fuhrer and Moore (1995).

The core of the model consists of five structural equations: (1) an “accelerationist” Phillips curve, (2) an IS curve relating real output to the long-term real interest rate, (3) a monetary policy reaction function relating the short-term interest rate to deviations of the rate of inflation from target, deviations of output from trend, and the lagged short-term interest rate to capture inertia, (4) the Fisher equation linking the long-term nominal interest rate to the real long-term rate and expected inflation, and (5) the expectations form of the term structure linking the long-term rate to a weighted average of the current short-term rate and rationally formed expectations of future short rates. Estrella (1998) demonstrates the key finding that the coefficient linking changes in real output to the spread derived from this model is dependent upon the coefficients in the monetary reaction function. In particular, the more averse the policy maker is to deviations of inflation from target the smaller the coefficient linking the spread to future output changes. Intuitively, if the policy maker is solely concerned with stabilizing inflation, then inflation and expected inflation will equal target inflation so that from the Phillips curve expected changes in inflation will be zero. Consequently, the spread has no predictive power for future changes in inflation and, in the Estrella model, no predictive content for future changes in real output. This result has the obvious but interesting empirical implication that shifts in the relationship between real output changes, and the spread will occur when shifts in policy regimes occur and that the strength of the relationship between the spread and output change will depend in part on the monetary regime in operation.

One feature of previous empirical work is that the relationship between output change and the spread has typically been modelled in a linear framework without investigating the possibility of asymmetric effects or structural shifts.

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