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Forecasting economic activity from yield curve factors☆

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ABSTRACT

This paper provides clear-cut evidence that the slope and curvature factors of the term structure of interest rates (yield curve) contain more information about future changes in economic activity than the term spread itself, often used in the literature as a predictive regressor of economic activity. These two factors reflect different information about future economic activity, which is smoothed out by the term spread. The paper shows that the slope factor has predictive power on future economic activity over longer horizons ahead, and thus may be interpreted as reflecting future business cycle conditions. On the other hand, the curvature factor, which enters the term spread with opposite sign than the slope factor, has predictive power on shorter movements of future economic activity which may be associated with changes in the current stance of monetary policy. These results hold for a number of world developed economies.

1. Introduction

There is a recent and continuously growing interest in the literature to examine if the term structure of interest rates (or the yield curve) contain information about future economic activity (see, e.g., Ang & Piazzesi, 2003; Ang, Piazzesi, & Wei, 2006; Argyropoulos & Tzavalis, 2015a, 2015b; Dewachter, Iania,

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& Lyrio, 2014; Estrella & Hardouvelis, 1991; Hamilton & Kim, 2002; Harvey, 1988; Kozicki, 1997; Moench, 2012; Plosser & Rouwenhorst, 1994; Rendu de Lint & Stolin, 2003; Rudebusch & Wu, 2004 inter alia). Most of these studies, in order to reveal the information content of interest rates about future economic activity rely on a regression model which employs the term spread between long- and short-term interest rates, referred to as the slope of the yield curve, as a regressor and output (or industrial production) growth rate as a regressand.[1] Estimates of this regression model indicate that the term spread predicts positive changes in real economic activity. They show that an increase in the long-term interest rate relative to the short-term one is associated with an increase in real economic activity for a number of quarters (or years) ahead. This is true for a number of countries aside the United States (US), see e.g., Estrella and Mishkin (1997) and Moneta (2005).

The above evidence is consistent with the theory. The short-term interest rate directly depends on monetary authorities' (central banks') decisions, while the long-term interest rates are determined by the expectations of bond market participants about future short-term real interest rates, inflation and risk premia. The positive slope of the term spread between long- and short-term interest rates about future economic activity can be explained as follows. A tight monetary policy, which increases the short-term interest rate and leads to a decline in future economic activity (or economic recessions), implies a zero (or negative) term spread. This policy will decrease long-term interest rates and, thus, it will flatten (or invert) the yield curve, since bond market's expectations about future recessionary conditions will increase the current demand for savings in the economy. The opposite will happen for an easy (loose) monetary policy, implying a decrease of the short term rate and, hence, a positive term spread, or yield curve slope.

Relying on recent work decomposing the term spread into the slope and curvature factors (see, e.g., Diebold & Li, 2006; Diebold, Rudebusch, & Aruoba, 2006), in this paper we address the following questions: First, if these two factors reflect information of the term spread about short or long term future movements in economic activity and, second, if they can improve the forecasting performance of the term spread about future economic activity, when they are used as independent regressors. Regarding the first question, there is a number of recent studies arguing that the slope factor of the yield curve reflects future business cycle (BC) conditions, while the curvature factor captures policy actions related to short or medium-term adjustments of the current stance of monetary policy (see, e.g., Bekaert, Cho, & Moreno, 2010; Dewachter & Lyrio, 2006; Dewachter, Lyrio, & Maes, 2006; Hordahl, Tristani, & Vestin, 2006; Moench, 2012). That is, if economic growth is considered to be undesirably rapid by the monetary authorities, the curvature factor will reflect the impact of a restrictive monetary policy on the term spread which will be undertaken by the central bank to slow down this growth rate. The above arguments should be also confirmed in the context of term structure regression models.

Regarding the second question, one may argue that using the term spread as a regressor in term structure models forecasting economic activity, instead of the slope and curvature factors, may not fully exploit the information content of the yield curve to forecast future economic activity. The slope and curvature factors capture opposite effects of the yield slope about future economic activity. These effects may offset each other to a great extend and, thus, they may reduce the ability of the term spread to predict long and short term movements of future economic activity. Our paper aims to shed some light on this question, from a forecasting point of view. If it is true, then the above term structure factors may be exploited for different forecasting purposes.

To retrieve the slope and curvature factors driving the yield curve and the term spread of interest rates, the paper employs the dynamic Nelson Siegel (1987) model (DNSM) (see also Diebold & Li, 2006, inter alia). This model is popular among market and central bank practitioners, as it has been found that fits adequately into yield curves. Consistently with evidence provided in the literature (see, e.g., Litterman & Scheinkman, 1991 and Bliss, 1997, or more recently Argyropoulos & Tzavalis, 2015a), it assumes that the level factor of the yield curve can explain only parallel shifts of interest rates

[1] Non-linear versions of this term spread model have been also suggested in the literature (see, e.g., Galvao, 2006; Venetis, Paya, & Peel, 2003. These studies do not undermine the role of the term spread to forecast future economic activity. However, in a more general framework, the relationship between finance and growth can be expressed linearly (see e.g., Stengos, Savvides, Mamuneas, & Ketteni, 2007).